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THE FARMER'S DIGEST

FORT ATKINSON, WIS

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FARMER'S DIGEST SUMMER PUBLICATION DATES

During the summer months Farmer's Digest is printed and mailed to you every 45 to 50 days instead of monthly. This practice, started years ago, keeps our subscription rates down by giving you fewer copies during the months you have less time for reading. You will receive the August-September issue on or about August 5. October and succeeding issues will again arrive near the first day of the publication month.

The **Farmer's Digest**

Volume 20 **June-July** **Number 2**

Four Ways To Add 30 Bushels To Your Corn Yields

The first six weeks after corn planting offer a wonderful opportunity to increase yields. Plan now to control weeds and insects and side-dress with enough nitrogen.

Condensed from Farm Profit

Careful Cultivation: 5 to 10 Bu.

CULTIVATION still is the best way to control weeds but on too many farms it "controls" corn production too. If you ram shovels 4 or 5 inches into the soil, you are pruning 10 to 15 bushels of corn to the acre. Corn roots branch out less than two inches beneath the surface.

Toll from root pruning is heavy. Nebraska, Illinois and Ohio tests indicate that proper cultivation is worth around 10 bushels per acre. In a Minnesota test where roots were pruned by deep cultivation, the loss was 16 bu. per acre.

Use shallow sweeps when you cultivate and stay away from the row. If one cultivation does the job, quit. Weeds steal fertilizer and moisture from your corn but the loss from root pruning may be even larger.

Spraying Weeds: 5 to 10 Bu.

"The average annual loss of corn due to weeds is around 10% of the crop," declares E. P. Sylwester, of Iowa State College. Even a moderate infestation can cost you 10 bushels.

Dr. Sylwester suggests this economical combination of spraying and cultivation:

1. Harrow to kill seedling

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weeds before you plant. Spend 75c to $1 to kill shoots of annual weeds.

2. After corn is planted, harrow again or if you prefer use a preemergence spray. Apply 2-4-D at 1½ lbs. per acre. Other good materials are dinitro, Alanap and Randox.

3. After corn is up, choose between rotary hoeing or spraying. Spraying corn up to 3 or 4 inch height is relatively safe and cheap.

4. Cultivate as needed. Spraying cuts cultivations required.

5. Spray after lay-by only as a "rescue" operation.

Insect Control: 5 to 10 Bu.

Spraying corn borers at Iowa State's Ankeny farm increased corn yields 7 to 15 bu. per acre. In Hardin county, the increase ranged from 4 to 21 bu.; the average was 8½ bu. If you have a big crop of borers you can make a good profit on spraying.

There's no blanket recommendation for spraying. You must check your own field for damage to determine whether or not spraying will pay. Harold Gunderson of Iowa State recommends: "Watch early-planted, fertilized, tall vigorously growing corn. Treat as soon as 75% of the plants show leaf feeding—we know it pays to treat such corn."

"In fields where 40, 50 or 60% of plants show leaf feeding, spraying is a gamble, but we know that the farmer will at least break even."

Spray second brood borers if you have 100 egg masses per 100 plants. Tests show 4 to 10 bu. increase.

Side Dressing: 10 to 20 Bu.

Late June and early July offer your last chance to give corn the plant food for the extra "high profit" bushels.

In 516 Minnesota tests spread over 3 years, the average increase in yield was 9.7 bu. where 40 lbs. of N was applied; $6 worth of N was doubled into $13 worth of corn.

There is nothing free about freedom. It is very expensive to secure and equally so to preserve.

Biggest advantage of side dressing is that you match the amounts to the stand and the growing conditions. This cuts some of the risk. Liquid nitrogen, anhydrous ammonia and the granular forms of nitrogen all are effective. If there are custom operators in your area, they'll fertilize while you bale the hay or fill silo.

If you prefer to side-dress with an attachment on your cultivator, you can combine fertilizing with lay-by.

Hogmen Must Adjust or Bust

Sound advice from two authorities . . a check list for success with hogs.

Condensed from Breeder's Gazette

H. M. Barnes and *W. H. Bruner*,
Ohio State University

IF YOU who are working to produce market hogs economically, these methods will pay:

1. Market hogs at 200 to 220 lbs. for economy of production and to pull heavy weights and extra fat off markets.

2. Produce the real Meat-type hog and save on feed costs.

3. Breeding stock is lower priced now. Sell off your two lardiest sows and put the money in the best Meat-type sow available, from a carcass-tested litter or family.

4. Keep your sow herd streamlined; don't waste feed by letting them get fat.

5. Let litters nurse to 8 weeks.

6. Use 20 to 25 lbs. of starter feed per pig from 3 to 8 weeks of age.

7. Feed balanced rations; supplement saves more than enough corn to pay for itself.

8. Use legume rotation pastures.

9. Feed shelled corn.

10. Check parasites and disease.

Time To Market

This year it will be important to top out the hogs fed for market at weights of 200 to 220 lbs. These hogs generally return the most profit. These weights usually top daily markets and cost less to produce.

To carry hogs much above 220 lbs. will increase the cost per pound of gain. In the fall of 1955 at Ohio State we ran a demonstration to show feed costs of carrying hogs from 200 to 300 lbs. To produce that last 100 lbs. of pork required 542.9 lbs. of feed, costing $11.87. Yet the hogs decreased $3.76 in total dollar value per head, resulting in a loss of $15.63 on each overfat hog.

If a hog weighs much less than 200 lbs. at marketing, his production cost is high because his cost from birth to weaning is distributed over fewer pounds. However, farmers sometimes

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

overemphasize this point in explaining their practice of feeding heavy hogs.

To feed a brood sow for half a year, 1,500 lbs. of feed is a generous allotment. A litter of 7 pigs sold at an average weight of 214 lbs. would indicate that each pound of pork sold must carry the overhead of one pound of feed for the sow. If this litter was made to weigh a ton, the overhead would be ¾ of a pound of sow's feed for each pound of hog sold. This might save a half-cent per pound on overhead, but you hog producers well know the difference in what you get for top hogs and those in the 280-lb. class.

Prospective Breeding Stock

Breeding stock should be selected on records that indicate: absence of inherited defects, prolificacy, sow's nursing ability, rapid growing and gaining ability, and efficiency of feed utilization.

Every producer should ear notch and keep a record of each litter as to time of farrowing and size of litter. These records will assist you in selection of gilts to improve the breeding herd. Usually it is best to select gilts when they are 5 or 6 months of age.

Records are also very important in selecting the boar. The Production Registry and Meat-type Certification programs of the various purebred breed associations should be of great assistance in selection of a boar. If a hog producer buys a boar from a Certified Litter he knows that his boar is out of a litter of 8 or more pigs raised and that all the individuals in the litter were free from inherited defects.

Most breeds have a weight standard for the litter at a given age (21, 35 or 56 days). You are also assured of good gaining ability. A representative pair of pigs from the litter must weigh 200 lbs. or equivalent at 180 days. This representative pair of pigs at slaughter time must also meet carcass standards as to backfat thickness, carcass length and loin-eye measurements.

A number of states are supplementing the various purebred programs through the use of an evaluation (f e e d i n g) station. These stations provide rate of gain, feed utilization and carcass information on a representative sample of a prospective breeding litter.

Data on 420 pigs representing 210 litters in Ohio indicate farmers can produce high quality Meat-type hogs as cheaply and efficiently as they can the overfat type. *Pigs from the Meat-type litters used 17.3 lbs. less feed to produce 100 lbs. of gain than did the non-meat type.* This represented a saving of approximately 50c per cwt. gain. There

was no significant difference in rate of gain to market weight of 210 lbs. Hogs from the Meat-type litters gained 1.69 lbs. per head daily; those from non-meat type litters, 1.68 lbs.

Sow and Litter

Have you been letting the sow herd carry around too much lard also? This is a waste of feed and does not contribute to better production. Several trials show that the sow or gilt can produce and nurse litters just as well on more limited feeding, and a pound of feed saved per head per day adds up to dollars.

Much study has been given to the various times of weaning. In the spring of 1955, at the Ohio Experiment Station, W. L. Robison and H. S. Teague weaned pigs at 3, 5 and 8 weeks of age. After including the cost for weight loss on the sows, they found that the pigs weaned at 8 weeks cost 36c less than the 5-week weaned pigs; and 58c less than those weaned at 3 weeks.

The price of creep rations may convince some producers that they can't afford to use them. Results at the Ohio Swine Evaluation Station, where pigs are started on test at 63 days of age, show that pigs that are bigger at weaning do better in the feeding period. The pigs weighing 40 to 44 lbs. reached 210 lbs. 8 to 12 days sooner than those started at 30 to 34 lbs. At normal daily feed consumption, the lighter pigs required 50 to 80 lbs. more of the finishing ration. Many have found pigs to be 10 lbs. heavier at weaning after the use of 20 to 25 lbs. of palatable, well-fortified creep ration per pig. And that amount will cost less than the larger amount of extra finishing ration at the end of the feeding period. However, the calendar should be watched and the creep ration should be stopped when it is time to shift to a growing feed.

Feeding and Management

Most of the costs in hog production are tied up in the feed. At the same time, good performance has a definite effect on amount and cost of feed.

This year some will skimp on protein supplement, which is a serious mistake. Even at present price levels a pound of supplement will save enough corn to make it profitable.

An acre of ladino was worth $37.13 to the hogs last year at Ohio State, while an acre of alfalfa was worth $31.25. This permits some feed saving in return for some extra labor.

For most farmers, the rotation pasture lot provides a much healthier place to feed out hogs than the dry lot. *Control of parasites and disease may bring you*

more feed saving than anything else you can do. Sanitary farrowing pens and sows are essential. Even when these are used, worming may be beneficial, and the new piperazine compounds show much promise for an easy, effective worming treatment. Ear marking the litters will help to find those problem sows that are carriers of some of the enteritis infections.

When hogs are low in price, the farmer is reluctant to spend money for cholera immunization and veterinarian fees. Until the industry can reach some degree of eradication of cholera and other conditions, you had best keep your insurance paid.

Today the progressive hog producer is thinking the swine industry can improve its position by increasing the production efficiency and the carcass value of the commercial hog crop. This can be accomplished by producing Meat-type hogs that have the inherent ability to produce superior carcasses efficiently and economically. In order to avoid seasonal market gluts he is thinking of timing his farrowings at different seasons of the year. He is prepared to make adjustments so that he can work out of it. He aims to cure the situation rather than take aspirin to relieve the pain.

Dairy Farm Numbers Decline Yet Milk Supplies Are Record High

The number of farms selling milk is declining. Yet total U.S. milk sales have reached a record high, as sales per farm rapidly increase. For the country as a whole, the number of farms reporting milk cows declined 1 per cent from 1944 to 1950 and an additional 20 per cent from 1950 to 1954.

Sales of whole milk per farm averaged 88,000 pounds per farm for the U.S. as a whole in 1954, an average of 240 pounds per day. Part of this increased volume, according to the USDA, is the result of rising production per cow. The rest is due to larger numbers of cows per farm. The gain in average rate of production per cow—between 1 and 2 per cent each year over the past 15 years—reflects improved quality of cows and better feeding management.

In other words, both United States cows and United States dairy farmers are becoming more efficient. —*Texas Extension*

Should You Buy That New Machine?

Base your decision on facts. Determine the annual cost of owning and operating the machine and balance that against the work it will do for you . . .

Condensed from Hoard's Dairyman

R. G. Smith, Cornell University

EVERYONE knows that farming has become a mechanized business, but few appreciate the importance of machinery costs in the farm business of today.

One cost-dollar in five goes to pay machinery bills on the average New York farm. Investment in machinery has jumped from about $1,000 per farm 25 years ago to over $7,000 per farm today. On a New York dairy farm, there is about $75 invested in machinery for every cow in the milking herd, and $4,000 invested for each man in the farm labor force.

These figures are enough to make a man stop and think before he buys a new piece of equipment for his farm business. If you're faced with the problem of whether to invest in a piece of expensive equipment try to answer these questions: What will it cost to own it? Can I use it efficiently? Can I get along without it?

What Will It Cost?

Sometimes we fail to look beyond the price of the machine to see what it will actually cost. If you are considering a new piece of machinery, first estimate its annual cost to your business. Following is a list of the costs to put down. Also listed are the average annual costs of field choppers with auxiliary motors as reported by a large group of New York farmers.

	Your machine	93 field choppers with auxiliary motors, 1952, New York
	$	$
Interest on investment		87
Annual depreciation		232
Cash repairs (include tires)		19
Labor for repairs		14
Fuel, oil, grease, etc.		34
Insurance		4
License (if any)		
Miscellaneous (housing, etc.)		12
Total		402

In calculating the cost to your business, you should also consider the cost of the time spent in operating the machine.

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The purchase price is just the first of your expenses in owning and operating a machine. By estimating the average annual cost, you will be better able to decide whether you can afford the machine.

Can I Use It Efficiently?

After estimating the annual cost of the machine, you are ready for this important question: "Can I operate enough more efficiently to justify the expense?"

Here are some of the items to consider in arriving at a decision:

1. How much work do I have for this machine (days or acres)?
2. Does owning this machine help make better use of other equipment?
3. Does buying this machine mean I'll also have to invest in companion machines?
4. How much can I save on repairs and delays which would occur with the old equipment simply by buying this machine?
5. How much labor will this machine save or replace?
6. Will I produce more by owning this machine?
7. Will owning this machine produce a product which is more valuable?
8. Where will my money bring the greatest return—in this machine, or invested elsewhere?

Consideration of all these items will give you a good basis on which to say whether or not you can use this machine efficiently. The following table on the annual use necessary to justify the purchase of selected machines may also be useful as a rough guide. These figures are from Pennsylvania State University:

Machine	Annual Use to Justify Purchase
Combine, 6-foot power take-off	50 acres
Combine, 6-foot auxiliary engine	70 acres
Combine, 12-foot self propelled	180 acres
Corn picker, 1-row pull type	36 acres
Corn picker, 2-row, mounted	50 acres
Forage harvester, power take-off	50 acres
Baler, twine tie, power take-off	84 tons
Baler, twine tie, auxiliary engine	142 tons
Diesel tractor	1,500 hours

What Alternatives Do I Have?

Few, if any, farms are large enough to justify ownership of all the modern equipment which is needed for farm operation. If your decision is that you can't use the new machine efficiently, what alternatives do you have?

- Buy it anyway, but use it inefficiently — can you afford this?
- Get along without it, and try to compete with the bigger business which can use it efficiently.
- Buy it and make full use of it by doing custom work.
- Go in with the neighbors

on cooperative ownership of the machine.

- Hire someone who owns the machine to do the job.
- Buy secondhand equipment.
- Enlarge the farm business to the point where it justifies owning the machine.

Each of the alternatives has its disadvantages or problems. The trend has been and will continue to be towards farm business units large enough and specialized enough to efficiently use new machinery and equipment as it is developed. However, many farmers find a partial solution to their equipment problems by hiring machine work done or owning equipment cooperatively. Probably more could profitably do likewise.

Keeping Machinery Costs Down

Equipment costs could be reduced on many farms if better records were kept. An annual farm inventory and a good farm cash account book will show you where the dollar leaks are in the machinery side of your business.

Analyze your business to see what your long-run equipment needs are. Have a program for maintaining and improving your machinery. A simple record system will help you do this.

When you buy a new machine, make your decision on the basis of facts. Calculate the annual cost to own and operate it. Balance this against the work it will do for you.

Finance your equipment purchases at lowest possible costs. Pay cash if you can. If you buy on credit, get your credit from your bank or someone in the credit business.

The value of the modern cotton gin as one of the effective means of controlling the pink bollworm has been pointed up by research done by the USDA's Pink Bollworm Research Laboratory at Brownsville. Gins utilizing elaborate equipment in the ginning process averaged killing more than 99 per cent of the pink bollworms.

Take good care of the equipment you have. Make it last longer. The more acres or hours of use you get out of your equipment, the lower your equipment costs will be.

Machinery is cheaper than labor, and will continue to replace labor on more and more farm jobs. This does not mean that you are ready for every new piece of equipment that comes along. If you're a typical operator, 20 per cent of your farm expenses are machinery expenses. More attention to your machinery dollars will help you ease the cost-price squeeze.

Artificial Drying Makes Hay in Eight Hours

Most dairymen will agree that artificially cured hay has more protein and vitamins than hay left to the vageries of wind and rain. But at what point can you afford such a system?

Condensed from New Jersey Farm and Garden

Dr. Mark Singley, Rutgers University

EVERY time you bring up the subject of hay drying, some farmer always asks: "But *just* how much more will it put into my pocket?"

Suppose you can even out your haying operation so you can mow five acres a day, and do it in an eight-hour day so you won't have to hire extra help? Is that worth something in this day of scarce labor?

Hay made last year by New Jersey farmers graded 62% U. S. No. 2 or better. With a good drying system, at least 90% of it should grade No. 2 or better. With alfalfa, for example, you will experience half as much dry matter loss with dehydrated hay as with field cured. Leaf losses can be seven times less with dehydrated hay, too, according to a recent USDA five-year study. And those leaves are rich in vitamin A and carotene!

Next, take the matter of grain-to-milk ratio. If grain costs $75 a ton, and milk is selling for $4, you've got to use all roughages to make any money. If milk averages $4.50 per cwt., you can afford to feed only one pound of grain to six pounds of milk. That's what careful experiments at Beemerville Experiment Station have disclosed.

That's when 17-18% protein content in roughage really pays off, as against the 12-13% roughage the farmer makes.

For several years people who could afford to experiment set up one elaborate system after another to try various ways of making hay. It is my observation that if you harvest more than 100 tons a year, you'll need heat in order to get it out of the

Reprinted by permission from New Jersey Farm and Garden, Sea Isle City, New Jersey

way as fast as you have to make it.

Of the systems I have examined, one that strikes me as very practical for the average dairyman is the one at Erdenheim Farms, Chestnut Hill, Philadelphia. Manager Stanley Gates has built a system that lets him level out his labor load. He dried 175 tons of mixed baled hay last season at an operating cost of less than $5 a ton—probably will shave that by $1 this year by recirculating the air. (Hay like that he made was selling for $65 a ton last month.)

He used an elaborate building, which cost nearly $7,000, but any farmer could erect a pole shed for a third of that, since it can remain open on both sides. He provides heat with a large PTO driven centrifugal blower (24,000 cubic feet a minute at ¾ inch pressure). He got it from an old rug mill. He uses two small portable heating units (420,000 BTU, 3½ gal./r., 4,000 cfm each) and funnels the air through an overhead delivery duct (4 by 6 feet, plywood bottom with three sides of canvas). All of this cost him $2,575.

Then he had an investment of $1,375 in five four-wheeled dollies, each capable of carrying a ton or more of baled hay on a flatbed wagon. He made five tons at a time and used each dolly and wagon about 35 times. These should have a life of 20 years with care.

Evils of Drink

Professor: "And in conclusion, my dear students, I shall give you a demonstration of the evils of the Demon, Rum. I have here two glasses, one filled with water, the other with whiskey. I will now place a worm in each glass. Notice how the worm in the water squirms and vibrates with the very spark of life, while the worm in the whiskey writhes in agony, curls up and dies. Now, young man, what is the moral of this story?"

Young man: "If you don't want worms, drink whiskey."
—Better Crops.

Drying time for the first crop was 14 to 16 hours, and for second and third cuttings, 18 to 20 hours. Gates uses a crusher at the time he is mowing because it helps speed up drying.

The hay wagons have plywood sides, reinforced with steel, and a lattice-type floor of 1x3-inch spruce lath, which provides about 18% floor opening. Each dolly is eight feet wide, 16 feet long and four feet high. Front and back ends have removable panels for loading and unloading operations.

The tractor tows the flatbed

wagon and loaded dolly into the shed. As the rubber-tired wheels of dolly go over portable wooden blocks, they raise the dolly to the proper height to put steel wheels (side-mounted on the dolly) onto railings on either side. Thus, the front weight now shifts from the wagon to the rails. Then the rear wheels of the wagon hump over the wooden blocks and lift the rear of the dolly to rail height. Then the wagon is towed out the other side and to another area to pick up an empty dolly.

The United States' per capita consumption of milk is lower than the amount used per person in several other countries. As a group, women consume the least milk. Older women use less milk than younger women, although their need for milk is just as great.

With the bale-filled dolly in place, a canvas hood is dropped down from the overhead chute, locked into place with suitcase clamps and the heated air is turned on. Output of heat and air can be varied with the individual load, according to size and moisture content. There is a separate trap door in the duct for each wagon.

The author is indebted to Mr. Gates and the Northeastern Hay Drying Association for details of this operation, which he has inspected. It seems ideal — with some of the building cost reduced — for any serious-minded dairyman who is girding his belt for what appears to be a highly competitive cost-income situation.

The Simple Life

A glance at the 277-page "List of Available Publications" of the U. S. Department of Agriculture is ample proof that farm life isn't what it used to be. Some sample titles picked at random include "Inheritance in Rice of Reaction to Helminthosporean Oryzon and Cercopera Oryzae"; "The Tatoo Method of Marking Hogs"; "The Cannibalistic Habits of the Corn Ear Worm"; "The Strawberry Rootworm as an Enemy of the Greenhouse Rose"; "Rest Rooms for Women in Market Centers." After looking over a few of the more than 8,000 different subjects, a farmer may well be tempted to order Bulletin No. 207 MP, "Raising Reindeer in Alaska," and get away from it all. —*Hudson Newsletter*

Facts About Pasture Irrigation

Irrigation will pay in a dry season on pastures that are well fertilized and have desirable plants. Many factors need to be considered . . .

Condensed from The Southern Planter

Dr. W. W. Woodhouse, Jr., North Carolina State College

"DOES Pasture Irrigation Pay?" That's a question we hear pretty often nowadays! It doesn't seem to be a question we can answer with a simple, straightforward "yes" or "no." Pasture irrigation is paying on some farms and on others it just isn't. That being the case it might help to take a quick look at what's involved.

First let's see what irrigation will do for us. It will keep pastures green and growing right on through a hot dry summer. By irrigating properly you can have pastures looking just about the same the middle of a dry July as they did in April. In a summer as dry as 1954 was in many places, this can mean double the production per acre, over no irrigation, whether you figure it in feed replaced, pounds of milk produced, or animal gains.

In addition, by keeping your pastures growing you avoid the overgrazing and loss of stands that you often run into with dry seasons and short pastures. We find that it's usually the overgrazing that goes with a dry season, rather than the dry season itself that hits our clover stands so hard.

What Does It Cost?

Next let's take a look at irrigation costs. You'll have to have equipment, water and labor. The cost of these will vary all over the map depending on your situation and how you figure them. On a good average set up in North Carolina the operating cost will probably run somewhere around $2 per acre inch of water applied. In a dry summer you'll need 10 to 15 inches to keep a pasture going so this adds $20 to $30 per acre. In addition, it will cost you around $10 per acre per year just to have the equipment on hand.

Thus your per acre cost will vary from around $40 in a real

Reprinted by permission from The Southern Planter, Richmond, Virginia

dry year down to not much more than $10 in the years you don't need to irrigate.

This makes it look as if pasture irrigation can surely pay its way in dry seasons where you have good pastures and high producing dairy cows. On the other hand, poor pastures and poor cows will have a rough time justifying the cost. It costs just as much to irrigate a poor pasture as it does a good one. Doubling the yield on a poor pasture still doesn't give you very much grazing.

Answer These Questions

The question you're really interested in is not so much whether irrigation pays or not but whether or not it's cheaper than any other way of getting your animals by the dry spells. After all you can get around dry spells in several ways—by sowing more pasture, putting up more spring silage from small grain or surplus pasture, making more hay, buying some extra feed or even by taking less production or carrying fewer animals.

Ask yourself these questions:

1. Am I using all my land to capacity or do I have idle acres that could be used to grow more dry weather feed?

2. Are my pastures well balanced, productive sods?

3. Do I have a topnotch herd that can make efficient use of good pasture?

4. Do I have an ample water supply located where it will fit into an irrigation scheme?

If you answer "yes" to all but four, pasture irrigation may better be your next step and a very profitable one. If the answer to any one is "no" there may be some other things you'll want to do first. This is a question you'll have to decide yourself for your own farm.

Special Situations

Even if irrigation seems to be out of the picture for your pastures in general don't overlook the fact that there may be some special situations where it will be just the trick. You may want to irrigate one heavy producing summer pasture such as millet or Coastal Bermuda just to carry you through dry spells.

Irrigation comes in awfully handy in establishing new stands. You can go ahead and sow on time, knowing that if that one rain that can make or break a new stand doesn't come, you can put it on yourself.

These special uses fit in mighty well where you have irrigation equipment for other crops and have some water to spare. This kind of pasture irrigation is bound to increase as more and more people get set up to irrigate other high acre value crops.

More Eggs With Windowless Houses

Windowless houses save building costs and cleaning; keep heat out in summer, heat in during winter. If you are planning to build, look into this new method of construction . . .

Condensed from Farm Journal

Glenn Lorang

FOR YEARS poultrymen have debated the problem of windows in their laying houses. Should they be kept closed during the winter, or should you leave 'em open for ventilation? Must they be on the south, or can they be on the east or west?

Now some farmers and engineers in Washington, Michigan and West Virginia are bidding fair to end the arguments once and for all. Their suggestion: Eliminate windows entirely!

And they can offer at least three good reason for doing it:

1. Cutting out windows saves building costs and eliminates the job of keeping them clean.

2. Insulating and air-conditioning a house keeps the inside temperature even the year around and avoids production slumps during hot and cold spells.

3. The improved ventilation means you can crowd more birds in the same floor space.

Does that mean the windowless house is really the hen house of the future?

It would take a bold man to say that. But if all the arguments prove anything, it's this: *A lot of poultrymen still aren't satisfied with their laying houses.* And if you're among this group, these new windowless houses may be just what you're looking for.

"We've had no winter slumps since we built our new house," declares E. D. Moser of Kootenai County, Idaho. "Or hot weather slumps either," he adds.

Moser and his son, Frank, don't have a window in their three-story insulated house.

"Why use windows, anyway?" they ask. "Everything the bird needs, except fresh air, light and water is right in the feed." C.

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

E. Lampman, head of the University of Idaho's poultry department agrees.

Electricity solved the lighting and watering problems years ago. And now the new high-capacity ventilating fans have solved the ventilation problem.

The Mosers mounted two 19-inch fans so as to pull air through their house from 21 anti-back-draft intakes. They sheathed with aluminum on the outside and with paper and 1" x 12" shiplap on the inside. Then they filled the six-inch stud space with shavings.

Not much point of insulating three walls if you're going to have just a thin layer of glass on the fourth one," says O. G. Wenzel of Spokane County, Wash. If moisture condenses on the inside of the glass on cold days, it's a sure sign you're losing heat, and need ventilation to boot.

Wenzel and his father have built two windowless houses and like them so well that they're planning a third.

"They're faster and cheaper to build," they claim. They used 6', 9' and 10' aluminum sheets for the roof and outside walls. Inside they sheathed with 6', 10' and 12' length of ¼" Masonite, and poured in shavings before nailing on the top strips.

"It goes together fast," the Wenzels say. Materials cost them about $2 per bird.

The houses are working for them, too. Shortly after a sudden freeze sent temperatures to 15 degrees below zero in mid-November, their hens peaked at 85% production, then leveled off at 82%.

"We held the temperature between 50 and 55 degrees, even when it was below zero," says Wenzel.

They use two thermostatically-controlled, 18" ceiling fans in each 70' pen, and 10" x 14" intake openings. They shut off one of the fans in winter.

Another Spokane County poultryman, Dick Yeo, carries temperature control a step farther. He has electric heaters that switch on and keep inside temperatures above 45 degrees in cold weather.

And this summer he plans to *add a refrigeration unit* to pump cooling fluid through pipes hung from the center of the ceiling in his pumice block house.

He keeps his birds in cages, and no-draft fans will direct the cool air over them.

Yeo's birds were nearly a year old last November when the freeze hit—yet they kept on laying at 65%. (Including equipment and cages, his house cost $3.32 per bird.)

Some poultrymen open large end doors to provide additional ventilation for windowless houses

during extremely hot weather.

A Michigan hatcheryman, Rich Dirkse, not only built a 48′ by 178′ windowless, cinder block house—he added a *slatted floor* to take the place of *litter and roosts.* The floor is a commercial product, and comes in 3′ x 4′ sections.

It consists of specially-made wooden lath set on edge, and spaced high enough to allow droppings to fall to the ground. For annual cleaning, Dirkse takes out the floor sections and runs in a tractor with a hydraulic scoop.

He partitioned the house into 21′ x 32′ pens of poultry netting. Hens lay in rollaway nests along the sides of a center alley, which makes for easy egg gathering.

How about lighting? A time clock controls the two double 4′ fluorescent light fixtures in each pen to give the birds a 13-hour day. Dirkse says it isn't necessary to dim the lights because the birds just roost down on the floor.

Dirkse sets his fans about as the Washington poultrymen do—to hold the temperature at 55 degrees. And here's why he likes his windowless house with the slatted floor:

1. He can put more birds in less space—1½ sq. ft. per bird.
2. He gets cleaner eggs, and spends less time gathering them.
3. No dust—no litter expense.
4. Less disease and broodiness.
5. Without windows, he can control the lighting the year around.

Corn Belt Scenery

Uncle Ezra was making his first visit to the West Coast. His relatives, eager to impress him with the wonders of their adopted home, drove here and there, pointing out places of interest. "There," they assured him "is a wonderful view of the mountains, but the fog hides 'em today. And from right here, you get a wonderful view of the bay — on clear days."

After a couple of hours, Uncle Ezra remarked dryly, "Mebbe we ain't got so much pretty scenery back in the Corn Belt but, by golly, you can see it."—Better Crops.

Dirkse filled the cores of the cinder blocks with vermiculite (Zonolite) and covered the ceiling with ¾-inch impregnated insulation board, with fill-type insulation above it. Dirkse put on a built-up roof and painted it with aluminum to give it a reflective surface.

The rollaway nests and set-up for collecting the eggs from the

160-foot long alleyway save a lot of labor. The two tiers of individual nests are placed with their backs next to the alleyway, and there are 72 nests per pen.

At the University of West Virginia, a windowless cinder block house is in its third year of testing.

Says Dr. A. D. Longhouse, head of the Agricultural Engineering Department, "The first two years of research with two broods of chicks and two laying flocks have shown that *we can produce poultry in a windowless house.* Now we're going to compare it with a house with windows, to see if it will actually make more profit.

Right now, that's the question any practical poultryman would ask. And as the windowless house idea picks up more steam around the country, we should get the answers.

Reed Hanson, associate poultry scientist at the Western Washington Experiment Station, points out that the amount of insulation and ventilation necessary will vary from area to area, and it will be hard to justify a fully-insulated house where the climate is moderate.

On the other hand, he points to evidence that if we gradually increase the day length with artificial light during the laying life of a bird, it might stimulate even higher egg production.

Time will tell.

"Steaming Up" Dairy Cows Didn't Help Production

"Steaming-up" dairy cows is a practice followed by many English dairymen in which the amount of grain fed is increased each week during a six-week period before calving.

Recently workers at the University of Illinois tested the practice with 18 cows and 18 heifers. They found that the "steamed-up" cows produced no more milk during the first 84 days after calving than did a similar group of cows fed only alfalfa hay and corn silage six weeks before calving. The grain feeding did, however, result in greater gains in weight. There was no difference between the two groups in the amount of udder congestion at calving.

—Virginia Extension

Should You Incorporate Your Farm?

There are advantages and disadvantages but it's s o m e t h i n g you should think about . .

Condensed from Successful Farming

August G. Eckhardt, Attorney

RECENTLY there has been an increase in the number of families or neighbors farming together — pooling their money and land instead of *each* fully equipping fewer acres.

If you make such a change you'll probably form a partnership or incorporate. Here are things to think about if you're considering *incorporating* your farm.

What Is Family Farm Corporation?

The *exact* form your farm corporation might take depends on the *type* of farm and your family.

Here's a typical example. Suppose you and your wife have three sons who are interested in farming. You might file articles of farm incorporation with the proper authorities *after working out details with your lawyer.* You transfer your ownership of the farm assets to the corporation in return for *shares of stock.* These shares of stock then represent your farm property. If your farm assets are valued at $50,000, the shares of stock *would have that total v a l u e when they're issued.*

Although the *corporation* now owns the farm assets, you control the business because you own all the stock. You can make one or more of your sons part owners by transferring to them some of the shares of stock — as gifts, as payment for labor, or as sales. If you sell a son one-fifth of the number of shares, he owns one-fifth of the business.

Farm profits of your corporation are paid to shareholders in proportion to the number of shares they own.

Here are some of the possible advantages to you of incorporation:

It May Protect Your Personal Assets

Your corporation has to pay debts and obligations contracted

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by you or anyone else having authority to deal in the corporation's name. But no one can take your *personal* assets or those of other stockholders to pay these *corporation* obligations. But if you have all your assets in your farm corporation, you are protecting nothing, of course.

You can get around this to some extent by personally holding title to some property and leasing it to your corporation. But the corporation may have trouble borrowing money unless principal stockholders bind *themselves as individuals.*

Incorporation Helps In the Transfer of Farm Ownership

You can transfer varying amounts of stock in your corporation without disrupting the continuous operation of the farm.

Your children can change their share holdings, depending upon their financial ability and their interest in farming. So a son who operates the farm can take a greater share of the profits through salary. He can get around the immediate problem of buying out the interests of his brothers and sisters.

Incorporation Can Help You Expand Your Operation

You can sell stock to some other member of the family or a close friend.

Another example: A Wisconsin farmer and his two sons each operate and manage a separate business — dairy, poultry, and beef — but they all work all three. When they decide to build a new poultry house, for instance, one son can provide the cash and be paid in more shares of stock. This requires no elaborate records and automatically takes care of profit distribution.

Incorporation May Save You Taxes

The farm tax picture is complicated and you'll want to go over all angles carefully with your attorney.

But in general we can say that *if you have a large taxable income you will save money by incorporating.*

What do we mean by large? On the basis of 1955 tax rates, about $14,000 is the breaking point. If you make that much a year, you will pay more tax as an individual than would a corporation. For example, on $25,000 of taxable income, a corporation pays $7,500, while an individual pays $10,150.

In terms of the capital gains tax, the small-income farm will save tax money under the individual tax rates, while the large-income farm business does as well by incorporating.

Also, if the farm income is in a high enough bracket, there will be lower *total* taxes paid if the income is split three ways — between father, son, and corporation, rather than just between

father and son. The breaking point here is about $20,000 income.

However, incorporation introduces the problem of double taxation. Most corporation profit is distributed to stockholders and is not a business deduction. So this income is taxed to the corporation when received — and to the stockholder when distributed. You may be able to devise a plan which will distribute all of the income as salary or bonus so that *the corporation will have no taxable income*, but this is difficult to work out.

Industries are demanding more and more trained personnel from agriculture colleges. Demands at present far exceed the supply. Some firms are placing seniors on the payroll even before they are graduated.

Local property taxes may impose another type of double taxation.

There Are Some Disadvantages To Incorporation

For one thing, there is a certain amount of paper work involved in keeping corporation records. And, there are direct expenses that go along with incorporating for filing the articles of incorporation, federal tax on the issuance of stock, and attorney fees. The charges and incidental expenses for forming a partnership are usually less.

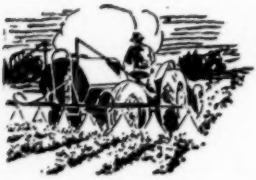
If the corporation is to be of short existence, the federal income tax probably will catch you to an extent that will make you sorry you incorporated.

You may have heard that incorporation lessens the benefits which society gains from typical family ownership — things like farm and community drive and pride. These objections are really not aimed at the family farm corporation.

Incorporation in *itself* won't harm the American family farm. *It will often improve it.* As a matter of fact, incorporation may be the very best means of keeping the farm in the family.

Just one more point. If you incorporate, be sure you comply with the requirements of section 351 (a) of the 1954 Internal Revenue Code, in order to avoid income tax liability resulting from your transfer of property to the corporation. These requirements, in general, are that the person who contributes the property to the corporation, (1) receives only stock of the corporation in payment for the transfer, and (2) controls the corporation immediately after the transfer.

Chemical Weed Control, 1956 Style



A combination of clean cultivation, chemical weed control and other good practices produce clean crops . . .

Condensed from The Ohio Farmer

C. J. Willard, Ohio State University

WEED CONTROL work in 1955 brought to light several exciting new chemicals. These may be available for use in the future if their promise in 1955 is fulfilled later. But, they will not be on the market this year. One reason for a slowing up in introducing new herbicides is the Miller amendment to the food and drug act, which has just gone into effect.

The Miller amendment is designed to protect the ultimate consumer against harmful residues, either in or on products. Consequently, every company that introduces a new product must furnish evidence to the food and drug administration. This must show: Either that the chemical in question does not leave any residue on or in the product when used according to the label directions; or that the amount which does appear is non-harmful in that amount. A tolerance must be officially established for such residue.

This is all to the good. It is better to be safe than sorry. Since we have gotten along for a few hundred years without these particular chemicals, it is a fair presumption that we can do so a little longer until they are shown to be safe.

As a user of these herbicides, you have no reason to fear penalties under the Miller amendment if you follow approved 1956 label directions. Use them on the crops intended and at the rates and times listed on the labels. Growers who use herbicides in any other way should satisfy themselves that the application they make will not leave illegal residues.

Several 2,4-D formulations were introduced in 1955 which contained two pounds 2,4-D acid per gallon, or less. There is already evidence that this trend will continue in 1956. This is highly unfortunate. It is based on the manufacturer's estimate that most farmers are more interested in price per gallon than in

Reprinted by permission from The Ohio Farmer, Cleveland, Ohio

what is in the gallon.

We have been through the same situation with fertilizers during the past 50 years. Fifty years ago the most common fertilizer in this area was the 2-8-2, a total of 12 per cent available, compared to fertilizers now which run up to more than 40 per cent available. The manufacturers then justified the sale of this low-grade fertilizer on the ground that farmers bought fertilizer by the ton and could not be taught to buy high quality goods. Farmers are now educated to buy high-analysis fertilizers.

Similarly, we have always recommended high-analysis herbicides. Obviously, moving charges, containers, freight and hauling have to be paid on twice as much material for a two-pound per gallon formulation as for a four-pound per gallon formulation. Thus, you can buy 2,4-D, 2,4, 5-T, or mixtures of them cheaper in a 3-1/3 or four-pound formulation than you can in a two- or one-pound formulation.

The same material can always be purchased in either form. We strongly urge you to demand 3-1/3 or four-pound-per-gallon formulations, rather than these low-grade products, put out on the assumption that the great majority of farmers will buy on price instead of quality.

All extension and other official recommendations of 2,4-D herbicides have been made on the basis of pounds per acre of the active ingredient (in this case 2,4-D acid) and the number of pounds of 2,4-D acid per gallon must always be stated on the label. If you buy two-pounds per-gallon material you have to use twice as much of it as of four-pounds-per-gallon material. You have twice as many cans to handle, with no compensating advantage.

Canada Thistle

Ohio farmers have never left us in any doubt as to the weed they consider most serious. Canada thistle gets their vote every time. Last year considerable work was done with a new herbicide, amino triazole (ATA for short), which is the most promising chemical so far tried for this pest. It is being sold by American Cyanamid Company, 30 Rockefeller Plaza, New York 20, New York, and American Chemical Paint Company, Ambler, Pennsylvania.

Although some "one-shot" applications of amino triazole have been remarkably successful, we probably should not expect a single application of ATA to destroy Canada thistle. After spraying, leave the thistle for at least two weeks, preferably three. Then plow and plant corn or other summer crops.

In Ohio, Indiana and Illinois, this technique has controlled 90

to 95 per cent of the thistles, with no injury to the corn. The cultivation of the corn gave an additional measure of control compared to treating thistles in a fence row or other uncultivated area. Like everything connected with ATA, this recommendation is still experimental, but is worth trying.

Quackgrass

Last spring we recommended applying dalapon at 5 to 10 pounds per acre active ingredient to quackgrass after it had made a vigorous early growth, usually the latter part of April. A heavy application of nitrogen on the quackgrass helps, and you will get the nitrogen back later in the year. Two to seven days after the dalapon is applied, the quack is plowed. Then, at least 30 days after the dalapon was applied, corn or other summer crop may be planted.

Seventy per cent of all goods sold at retail each year are made up of items coming from the soil.

Corn is preferable, however, because it is somewhat less sensitive to dalapon than soybeans and because the cultivations usually given corn help to control the quack. In 1955 demonstration tests, this method worked almost perfectly. It did not kill all the quack, however, and further cultural or chemical treatments should be anticipated before it will be eradicated.

Wild Garlic

For the second year in succession, 2,4-D on garlic early in March, when the temperatures were around freezing, was almost ineffective. The same three-pounds-per-acre rate put on late in March when the temperature was around 60 degrees Fahrenheit, was very successful. We feel, therefore, that we should change the recommendation made in Bulletin 337 for very early treatment of garlic with 2,4-D to: "Treat as soon as possible after temperatures have reached 60 degrees Fahrenheit, using a low-volatile ester formulation."

Weeds In Legumes

While there is no chance that the materials will be on the market this year, it may be of interest to mention a new group of compounds which were first used last year. These compounds are analogs of 2,4-D, only instead of being phenoxyacetic acids they are phenoxybutyric acids. Some compounds in this group have been very successful in taking certain broadleaved weeds out of red clover and alfalfa. This is an illustration of the increasing number of selective herbicides which may be at our disposal in the future.

New Way To Kill Corn Borers

DDT Granules offer a new and effective control for corn borers . . .

Reprinted from Iowa Farm Science

H. C. Cox, W. G. Lovely
and
T. A. Brindley

THE EUROPEAN corn borer actually is a misnamed insect. At least two-thirds of the "worm" stage of its life is spent feeding on the surface of leaves and leaf sheaths. Only during the latter part of its life does it tunnel into the stalk and become a *borer*.

Approximately half the life span of the worm is spent down in the whorls of the corn plants, feeding on the succulent leaves which make up the whorls. This habit — combined with the fact that the whorl leaves form a natural tunnel down to where the borers feed — makes the corn borer susceptible to a new method of control. This is the application of insecticide granules.

DDT granules resemble common table salt in size. They're simply clay or tobacco particles impregnated with DDT. When dropped onto a plant, they roll down the leaves into the whorls and leaf axils.

Effective Control . . .

How does borer control with granules compare with borer control by spraying? We made several comparisons in 1954 and 1955. Granular DDT was just as effective as DDT emulsion spray. In fact the granules gave about 20 per cent better borer control than the spray in one experiment. A portion of the results are shown in table 1.

A number of materials that can be used as carriers (the granules *carry* the insecticide) are available in granular form. Some carriers are better than others for corn borer control. We tested seven materials and found three to be better than the rest. The best was an attapulgite clay

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known at RVM-AA Attaclay, followed by tobacco base and bentonite. RVM-AA Attaclay was better than another type called LVM-A.

Granules come in various sizes, usually expressed in particle-size ranges, 30/60 mesh, for example. This generally means that all the particles will pass through a 30-mesh screen but will be retained on a 60-mesh screen. We compared DDT granules of various sizes and found that the 30/60 mesh range gave better control than larger particles.

TABLE 1. Comparison of Treatment with Granules and Emulsion Spray at the Rate of 1½ Pounds of DDT per Acre, Ankeny, Iowa.

Treatment	Borers per 100 plants 1954	1955
7.5-per cent DDT granules:		
On Attaclay	39	43
On tobacco base	37	93
Emulsion spray*	57	43
Untreated	123	330

*Applied at 10 gallons per acre.

Application Equipment

Power dusters, commonly used for crop dusting, are *not* satisfactory for applying granules. Tobacco granules tend to "bridge over" and stop up the feed openings. Clay particles may pack in the hopper bottom. In one of our experiments, the packing was serious enough to break the agitator and feed belt. Also, the granules are carried in the strong air stream created by the duster fan and bounce off the corn leaves instead of rolling into the whorls.

Our work shows that a seeder type of distributor is desirable. The seeder allows the granules to fall into the whorls. In 1954 and 1955 we modified and used a grass seeder. All the box openings except the three directly over each row were closed. The distributor was mounted on a high-clearance sprayer frame to allow experiments on second-brood borers.

Application Rate

How much DDT or how many pounds of granules per acre does it take to kill borers? We tried various rates of application ranging from 3 to 20 pounds of granules per acre. The granules contained four different concentrations of DDT. Our results show that from 15 to 20 pounds of 5-per cent granules give the most practical and economical corn borer control.

When to Treat . . .

Good borer control with a DDT spray depends on the time of application. The same is true with granules. However, the timing of granules may not be quite as critical as with sprays. Why? The granules fall deeper

into the whorl and consequently remain nearer the point of feeding for a longer time.

The best control of first-brood borers from a single application of DDT can be obtained by treating when 75 out of 100 plants in a field show signs of leaf damage. The first evidence of borer feeding always appears as pinholes or shotholes in the whorl leaves.

When to treat to obtain good control of the second brood is more difficult to determine. We suggest treatment at first signs of hatching if 100 egg masses per 100 plants are present — or if a large moth flight is in prospect.

Don't blame the five day work week on the Twentieth Century. Even Robinson Crusoe managed to get all his work done by Friday.

Increased Yield . . .

Our experiments in 1955 showed that first-brood borer control is both practical and profitable. Yield estimates made in five experiments are shown in table 2. The data are based on weights of shelled corn, dried to 15½ per cent moisture.

As might be expected, control of borers in the most heavily infested plots resulted in the greatest yield increases. Assuming that it cost 2 bushels of corn per acre to treat for borers, the per acre yield increases obtained in any of these tests would still have allowed a comfortable margin of profit as a result of treatment under conditions of the 1955 tests.

Residues . . .

Residue analyses show why granules do such a good job of killing corn borers. Remember that young first-brood corn borers feed for a long time in the whorls. We found about three times as much DDT in the whorls of plants treated with granules as we did in the whorls of sprayed plants. Yet the leaves of sprayed plants had about 40 times as much DDT as leaves of granule-treated plants.

Second-brood borers, the ones that cause dropped ears about harvest time, usually feed in the axils of leaves after hatching. The axils of granule-treated plants had as much DDT as the axils of sprayed plants. The leaves of sprayed plants had far more DDT residue than leaves of plants treated with granules. Our studies also showed that at harvest time the sprayed plants had 10 times as much DDT residue as the granule-treated plants.

DDT granules have several advantages over DDT emulsion. Equipment for granule application is much easier to operate, calibrate, clean and keep up. There's no worry about proper placement of nozzles. The use of

granules doesn't require hauling water. There are no insecticides to measure or mix. Approximately four times as much acreage can be treated with a given pay load of granules as with an equal weight of spray. Finally, the material may be applied in slightly windier weather than sprays.

TABLE 2. Estimated Increases in Yield of Shelled Corn Due to First-Brood European Corn Borer Control, Ankeny, Iowa, 1955.

Experiment	Borers 100 plants		Average yield increase
	Untreated	Treated	(bu./A.)
1	174	50	7.1
2	293	76	9.5
3	330	26	8.3
4	414	37	15.0
5	434	75	11.9

Grain Drier Solves Many Farm Problems

A grain drier may be the answer to many problems on your farm.

J. L. Calhoun, Virginia Polytechnic engineer, says a drier can help prevent spoilage. It makes it possible to harvest grain when mature, thus reducing the chance of storm damage. Grain can be harvested faster because the combine can be operated from early morning until late at night. Then too, the grain can be marketed without a discount for high moisture content.

A grain drier forces air through the grain, taking out the excess moisture. When the water content has been reduced to about 13 per cent, the grain can be stored safely.

There are two general types of grain driers — forced natural air and forced heated air. An electric motor driven fan is the heart of a forced natural air system. Air from outside the buildings is blown through the grain. A unit known as a portable crop drier is recommended when a forced heated air drier is to be installed. This drier has a built-in heating unit in addition to the motor and fan. and makes it possible to dry the grain faster.

The choice as to which type to use depends on the situation on the farm. On some farms, a single motor and fan unit can be used to dry hay and corn as well as small grain. Large producers often find a portable crop drier the answer to their dairying needs. These crop driers are mounted on wheels. They deliver heated air and can dry a large volume of crops during the season. *Virginia Extension*

Cheaper Gains in Cattle Feeding

These ideas may help you reduce your costs. They have worked well on Missouri farms . . .

Condensed from Missouri Ruralist

Cordell Tindall

THE search for cheaper gains in cattle feeding has taken many turns in recent years. Developments in feeding have been rapid with improved protein supplements, vitamins and now female hormones. Labor of feeding always has been a factor, so we have the power feed wagon, feed elevators and conveyors. In Missouri, especially, we've tried to find ways of utilizing more cheap roughage feed—and pasture. Or is grain the cheapest feed, all things considered?

It's obvious the only way to beat declining prices is to cheapen the cost of producing beef.

Today's successful cattle feeder has to be a shrewd manager with lots of know-how. More and more smaller operators are feeding out cattle in an effort to increase volume of production of smaller farms.

Let's take a look at some of the ideas found on Missouri farms for cheapening gains in cattle feeding.

Everyone admits one of the first things to do is reduce labor costs. Self-feeding is one answer and Marion Mahnken, Salisbury, has one operation that reduces labor to a bare minimum. He is self-feeding silage and molasses-urea.

Despite the fact he didn't think it would work, he is starting his second year of self-feeding steers and is highly enthusiastic.

Mr. Mahnken has a trench silo dug into sandstone that is 45 feet wide at the bottom. He has built a simple stanchion feeder that can be moved along as the silage is eaten. There are 30 "head-holes" and he is of the opinion about 4 steers can be fed for every hole. The big trench silo is well packed, has no covering of any kind on the silage.

Were it not for the fortunate location of the sandstone it would be necessary to have a concrete silo with concrete paving and

Reprinted by permission from Missouri Ruralist, Kansas City, Missouri

feeding floor, he admits.

With practically all labor of hauling silage eliminated, Mr. Mahnken looked about for a simple method of self-feeding protein supplement. He is using a mixture of molasses and urea which he buys in drums. He built a dock just below the silo and here can store a truckload of drums. A small stock tank that will hold more than a barrel is situated alongside the dock, and as steers eat the molasses-urea mixture from the tank another barrel of the mixture is emptied into the tank. With the raised dock it's simply a matter of tipping over the barrels. A wooden lattice-work float is used in the tank.

Mr. Mahnken reports steers eat about 1¾ pounds of molasses-urea mixture daily. Cost is about 3 cents a pound. He is highly pleased with gains, but admits that perhaps they are not quite as good as with a top-quality dry protein supplement. He's willing to sacrifice just a little gain for laborsaving features of this system.

Molasses-urea combination is proving popular with many cattle feeders. Only thing about it Mr. Mahnken doesn't like is with this system he has found no way of feeding stilbestrol. This female hormone is fed with dry protein supplement—as yet there has been no way developed of mixing it with molasses.

One possible solution to this problem — one faced by many other cattle feeders—has been suggested by Dr. William Pfander, Missouri College of Agriculture. He suggests feeding stilbestrol with the salt mixture. We must emphasize that this idea has not been worked out yet. Stilbestrol is fed at the recommended rate of 10 milligrams daily, and it's fairly easy to regulate the amount eaten when it is mixed with a dry protein supplement. The problem is to work out a plan in which cattle would receive the recommended amount through salt.

One new development in the feed business is the portable feed grinder and mixer that goes from farm to farm doing custom work. These new machines also can be used to mix molasses with home-grown feeds. Richard Gesling, feed dealer at Salisbury, bought one of these machines a year ago and it proved so popular he bought another.

He points out 2 big advantages in adding molasses—cattle eat all of the ground feed mixed with molasses and they drink more water. There's little doubt that cattle find it tasty. Mr. Gesling also can add a molasses-urea mixture to ground feed, as well as dry supplements.

What about urea as a cheap source of protein? It would ap-

pear urea may get even cheaper as production increases and imports pick up. When first fed a few years ago it was recommended that no more than one third of the protein supplement be made from urea. However, in tests at the University of Missouri, sheep are getting a complete urea supplement. Let's emphasize again this is a test.

NATIONALITY TEST

The French claim they can tell the nationality of an automobile driver by the way he behaves when a tire bursts. The American throws away the old tire and buys a new one.

The Englishman takes the damaged tire to a repair shop.

The German looks up in a manual: "What to do when a tire bursts."

The Russian makes 50 pairs of rubber heels out of the flat tire.

The Swiss thereafter carries two spares instead of one.

The Italian complains against the government.

The Frenchman writes a letter of protest to the manufacturer.

The Scotsman gives up driving.

Is stilbestrol as good as claimed? All evidence to date indicates this is true.

Sam Rowe, Extension animal husbandryman, holds a series of winter livestock meetings every year. We asked him what he planned to recommend this year on stilbestrol.

"We're now convinced it's just as good as advertised, and we are going to advise feeding it as recommended," he said.

Iowa State has conducted 8 tests in 2 years with 265 cattle. And 8 other experiment stations have reported 11 other tests, a total of 548 cattle used in 19 experiments. In only one test, in Kansas, were results unfavorable. This one test was with steer calves fed a high-roughage ration.

Average stimulation in gains was 16 per cent—ran as high as 37 per cent in individual lots. Best results were with high-grain rations and heavy cattle respond a little better than light cattle. Also, steers show a little better result than heifers.

Feed costs have been reduced in 18 of the 19 tests—average reduction was 12 per cent. Iowa tests averaged 10 per cent.

In general stilbestrol brought about a little greater feed savings in high-grain rations as compared to high-roughage rations. Appetite was stimulated an average of 3 per cent, but in some tests

there was no increase in appetite.

Little difference has been noted in carcass grades.

Seldom has a new practice caught on as quickly as feeding stilbestrol.

Still another new development can be reported in cattle feeding —use of rumen bacteria in feed at the very start of a feeding program. A St. Joseph feed company now is selling what is called a "cattle charger." It contains rumen organisms and is fed for only 2 weeks.

Although this starter is much more expensive than regular feed, amount fed is small. Recommended amount for calves from 200 to 500 pounds is ½ pound a day. A pound a day may be fed heavier cattle.

The starter is simply spread on grain or silage. It's not very palatable and it has been found best to mix it with regular protein supplement feed. Hay should be fed, too, and plenty of water.

One benefit claimed for the feed is to reduce losses from shipping fever. Feeders using this starter report ailing cattle or cattle "off feed" grain regain appetite quickly. In fact, the charger can be used as a drench with good results. Drenching for 3 days usually results in cattle getting back on feed.

The whole idea is to get cattle put in the feed lot off to a flying start by stimulating bacterial action in the rumen. We've saved a rather unusual cattle feeding operation until last — a highly successful operation with a few new angles for Missouri. We visited the farm of J. F. Barry, near Pattonsburg, to check results of feeding the cattle charger. And results from using this starter feed have been excellent. Mr. Berry is well pleased and plans to feed it every year.

But the system used by Mr. Berry and his sons is in marked contrast with the more usual system of utilizing roughage feed followed in Missouri. Nothing succeeds like success, and Mr. Berry's system has a record of many successes.

Briefly, here is his plan: he buys top-quality light calves in the fall, starts feeding them corn and 32 per cent cattle supplement at once. When calves are 400 pounds they get about ½ pound of supplement a day, with good legume hay. Calves are confined to one lot—it's a big one—all the time they are on the farm. They are fed corn and supplement about a year, maximum amount of corn is 15 pounds a day and supplement maximum is only a pound. Mr. Berry gets an average of about 2 pounds of gain a day.

About July a switch is made from feeding good legume hay

to feeding poor-quality hay or straw. Recently, when we visited the farm, oats straw was being fed.

Proof of the pudding in this case are the cattle. The good, meaty kind, they're butterball fat and of top quality. He gets a premium when he goes to market —one St. Joseph packing firm watches for the cattle and buys them every year. What about cheap gains from cheap roughage feeds? Mr. Berry reports this was the plan he followed for saving equipment for doing the actual feeding.

One thing that makes his system work so well is the calves are young—and tests show gains are cheaper on younger cattle. Last year his calves weighed 338 pounds in November when he bought them. He estimated the average weight at 1,050 this November.

What's ahead in cattle feeding? Most everyone agrees the future holds a lot of promise for new ideas in livestock feeding.

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same time as rate of lay and hen prices are likely to be low in late spring.

As an example for the above statement, the economists point out that if a five-pound hen with a 50 per cent rate of lay can be sold for 18 cents in March compared to 12 cents in June, then the reduced income from the sale of the hen would offset the egg income from the hen if she returned 10 cents a dozen over feed costs.

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It all goes to show that farming is like any other business . . . .

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Proof of the pudding in this case are the cattle. The good, meaty kind, they're butterball fat and of top quality. He gets a premium when he goes to market —one St. Joseph packing firm watches for the cattle and buys them every year. What about cheap gains from cheap roughage feeds? Mr. Berry reports this was the plan he followed for many years. He has a big farm and produces considerable hay.

"I like this plan much better," he says, "and I think I am getting cheaper gains with grain when all things are considered."

Labor is a factor, too, and he thinks buying corn may be the best bet in his operation. He is looking ahead to more labor-saving equipment for doing the actual feeding.

One thing that makes his system work so well is the calves are young—and tests show gains are cheaper on younger cattle. Last year his calves weighed 338 pounds in November when he bought them. He estimated the average weight at 1,050 this November.

What's ahead in cattle feeding? Most everyone agrees the future holds a lot of promise for new ideas in livestock feeding. Doctor Pfander at the Missouri College of Agriculture has one idea that's a good one to kick around—why not self-feed silage with grain and protein supplement added to the silage as silo is filled? If you want to finish out feeding with more grain, add grain to silage at rear of silo. Anybody want to try that one?

Sell Hens When Rate of Lay, Prices Begin Drop

During 1956, poultrymen might be wise to sell their oldest hens when their rate of production is no more than 50 per cent, say University of Missouri agricultural economists. If egg prices take their normal pattern during spring months, prices will be falling at the same time as rate of lay and hen prices are likely to be low in late spring.

As an example for the above statement, the economists point out that if a five-pound hen with a 50 per cent rate of lay can be sold for 18 cents in March compared to 12 cents in June, then the reduced income from the sale of the hen would offset the egg income from the hen if she returned 10 cents a dozen over feed costs.

Dairy Records Point the Way

Doing without good dairy records is like driving a car without lights on a dark night. You can neither see where you're going nor know where you've been . . .

Condensed from New Mexico News

E. E. Anderson, Extension Dairyman

CAN YOU imagine a bank staying in business if no records were kept on deposits and withdrawals?

If such a bank were in existence, it would operate on the theory that as much money would be put in as would be checked out by its patrons. Fantastic, isn't it? It just couldn't happen. But we have scores of dairymen attempting to run their business along this line. They have little or no knowledge of whether a cow is taking more out of the business in the form of feed and other costs than she is putting back in the form of milk produced. Such dairymen remain solvent only as long as the entire herd, as a group, put more back in the business than is taken out.

Dairying is fast becoming a big business. And to compete in big business requires big business methods. One of the essentials in any successful business is adequate records. The dairy enterprise does not require an elaborate set of records, but we do need to have certain basic information on every cow in the herd. Organized testing, such as Dairy Herd Improvement, provides a very complete system of records. Where such testing is not carried on, every dairyman needs to keep sufficient private records to provide a health history of each cow, breeding and calving dates and should have some system of determining the amount of milk each cow gives at least once a month.

Production records play an important role in feeding. Dairymen who get the most for their feed dollars know, that normally, feed nutrients can be supplied from roughages more cheaply than from concentrates. Consequently, their aim is to get all the production possible from roughages. They base the con-

Reprinted from New Mexico Farm News, New Mexico A. & M. College, State College, New Mexico

centrate allowance on the amount of milk a cow is producing beyond the amount she can make from the roughages she is getting. To do this, of course, requires a fairly accurate knowledge of what a cow is producing.

Without records, it's impossible to cull wisely or develop a sound herd building program. Culling or the removal of animals that take more from the business than they put back, is not as simple as some people think. There are many angles to take into account. Probably the first thing to consider in culling is production. To be profitable, the value of the milk a cow produces must nearly equal twice her feed cost. That's because the cost of feed usually runs from 50 to 60 per cent of the total cost of production.

Harvesting your oat crop as silage gives young legume-grass seedlings a break by cutting down competition for light and water.

Most dairymen set a standard or a definite figure at which a cow must produce to remain in the herd. This figure varies with different price conditions under which a dairyman operates. Many dairymen figure that a first-calf heifer must produce from 300 to 350 pounds of butterfat, or a mature cow, 350 to 400 pounds of butterfat annually to be profitable. Cows producing below this figure are eliminated. On the average, a mature cow will produce 25 to 30 per cent more than she did as a first-calf heifer. In estimating what the total production for the year will be, a rough guide is — a cow will produce one-eighth of her total years' production the first month, and one-half during the first four months.

In arriving at roughage requirements, a fairly accurate rule is that a cow will consume ten times her weight of hay or its equivalent, annually. That means a 1,000 pound cow will eat 10,000 pounds of hay or five tons in a year. A 1,400 pound cow will require seven tons of hay a year.

If fed according to production needs, a cow yielding 250 pounds of butterfat annually should get about 1,000 pounds of concentrates. A cow producing 350 pounds of butterfat needs 2,100 pounds, and a cow making 450 pounds of butterfat requires about 3,100 pounds of concentrates.

There are other things to consider in culling besides production in relation to feed costs and value of products produced. For instance even though a cow is not paying her way, it may be desirable to keep her through a base building period. In some

cases it may be profitable to keep a cow temporarily even though she is little more than paying her feed bill. Unless her removal will cut labor costs, there may be no reason for eliminating her until a satisfactory replacement is available.

On the other hand, it may be practical to cull the cow that is hard to settle or is dry too long, even though she is a heavy producer when in production. Certainly one will not want to save replacements from the shy-breeder cow since this fault is likely to be transmitted to her daughters.

There are additional undesirable qualities that are passed on from parent to offspring that should be considered in determining whether a cow should be culled, and very definitely in selecting replacements. Some of these are loosely attached or pendulous udders, ill-shaped feet or legs, lack of hardiness or resistance to disease, bad disposition, and short life.

Other necessary records are those of breeding and calving dates. It's very important to know when a cow is due to calve in order to know when to turn her dry. Calving dates are essential for determining when to breed again. The reproductive tract is more susceptible to infection and breeding troubles are more common in cows bred back too soon.

There are many other good reasons that show the importance of records in successful dairy herd management. Dairying without adequate records is like driving a car without lights, on a dark night. You can neither see where you're going nor know where you've been.

Tractor Wheel Weights Save Gasoline

Wheel weights on a tractor will pay for themselves in fuel saved, says Engineer T. C. Skinner, Florida Agricultural Extension Service. He cites results of a recent experiment as proof.

Mr. Skinner reports that a tractor with 3,100-pound wheel weights pulled a 1,500-pound load over two miles in fourth gear on one gallon of gas. But an identical tractor without wheel weights covered only a mile and a quarter on one gallon of gas in the same type soil. —*Florida Extension Service*

Paratyphoid Dysentery in Sheep

Here are latest measures of prevention and control of this troublesome sheep disease . . .

Condensed from
Sheep Breeder and Sheepman

Dr. A. A. Case, D.V.M.

PARATYPHOID dysentery is an infectious scours of lambs, and sometimes older sheep, that commonly appears following prolonged transportation where irregular or no feeding is done.

Several other conditions may also be present to complicate the picture. A recent example of this is the one where several hundred Spring lambs were moved from Southwest Texas to Missouri last fall, a distance close to 1200 miles. Within a few days, many of the band were sick. The affected sheep showed marked depression, loss of appetite, fever, and a fetid diarrhea. Some of the sheep also showed many signs of photosensitization and were very stiff and sore in their gait. Other sheep showed symptoms generally associated with nutritional upsets and the attending veterinarian recommended some changes in the management and ration which seemed to help the whole band although a few sheep continued to sicken and die. Several were infested with screw-worms and there had been losses from either wolves or dogs.

The attending veterinarian called on the School of Veterinary Medicine for some help in solving the problems on this place although he had done a very good job of correcting the overall problem. The author and another staff member made an investigation trip to this ranch which was about 220 miles "down in the country" from the University. The rancher grew up with sheep and he had not seen anything exactly like this before. Most of his experience with sheep had been in his home area of Southwestern Texas and he was not familiar with conditions in the area where he now had the sheep.

It was evident, after several sheep had been thoroughly examined and complete postmortem examinations performed that no single condition but entirely different troubles were present.

Reprinted by permission from the Sheep Breeder and Sheepman, Chicago, Illinois

The owner said that these were "tailings" from several thousand other lambs which were not affected by any kind of sickness and had done well.

As this band of sheep originated in country where bluetongue is a problem, they were vaccinated (or supposed to have been) against this infectious disease which is also known locally as "sore muzzle." About 10 per cent of the band which were showing signs of photosensitization reactions also showed indications that they had either had severe reactions from the vaccination or had actually suffered from attacks of the disease. The local plants that could have caused photosensitization in sheep undergoing such reactions or light clinical infections were represented by the bull nettle, smartweeds, and crab grass. The sudden losses where sheep were found dead could have been from eating too much spurge, as this plant is quite toxic as well as a photosensitizer.

Although these sheep had been wormed before shipping North, there were scatterd but light infestations of stomach worms and some nodular worms, both of which can raise havoc with sheep, especially sheep coming into an area from places where there are few or no parasites present. It has to be kept in mind that many sheep can be lost during the prepatent stage of parasitism (when the parasite is in the process of establishing an infestation). The parasites in this flock were just contributary to other problems.

The livers and kidneys of the dead sheep (one of which was recently killed by a wolf) showed marked degeneration which was probably a sequel to the virus-photosensitization reaction. However, *Salmonella* bacteria were recovered from one of the sheep sacrificed for examination as well as numerous others in the flock. The exact species of Salmonella will have to be determined but it is probably close to or identical to *S. typhimurium* which has been reported from many such dysentery outbreaks in lambs, especially from Colorado, Australia, and Europe.

There have been reports of food poisoning in man which resulted from eating flesh of lambs which were suffering from paratyphoid dysentery when they were slaughtered. One such outbreak in Germany a number of years ago resulted in over a thousand people being sick with several deaths. For this reason, it is very important that no lambs are sick with Salmonellosis when they are marketed.

This kind of dysentery, which may also affect feeder cattle, is best treated by isolating the known affected ones from the well and giving some special care

which includes a light, nutritious diet and one of the specific drugs used against salmonellosis. The treatment should always be carried out under the directions of the attending veterinarian. The vitamin A should be greatly increased for a period of two or three weeks, then reduced to a medium high maintenance level, as these enteric conditions are generally worse when the vitamin A level is low in the ration and the young animal has not had a good chance to build up a vitamin A reserve.

As far as the blue tongue is concerned, it would be very difficult to prove this disease present unless a much earlier check had been made by specialists familiar with the disease and early enough that the sick animals were still carrying higher than normal temperatures. However, the livid purple discoloration about the coronary bands of the feet, the peeling ears, destroyed eyes indicated that this disease was or had been present, as noted above. The damage to the liver and kidneys, and the history of some sores on the muzzles was also indicative that some of the sheep had suffered from blue tongue, or at least, a very severe vaccination reaction.

The thing that has to be kept in mind when any animal is vaccinated, regardless what for, is that no immunity is present until the animal has had time to respond to the antigen. This ranges from 2 weeks for enterotoxemia vaccination to as long as 3 weeks or longer for such vaccinations as soremouth or blue tongue. If the lamb is too young, its response will not be as good as if it is older. However, the vaccination should be given so that it has time to be effective before the need for protection is challenged by exposure to the disease.

If animals are already sick and dying from a condition, then additional losses may be expected before vaccination can become effective even though it be given immediately as soon as the first sick animal is noticed. In the case of enterotoxemia, it is possible to give immediate protection by use of the antitoxin but there is no antitoxin for bluetongue and many other of the infectious diseases.

Owners have asked what the source of salmonellosis is. In sheep there are undoubtedly carrier animals which show no symptoms of the disease but they shed the germs so that other sheep are exposed. This particular kind of salmonella is also often associated with rats and mice, its probably natural host animals, but is closely allied to the colon-typhoid group of germs of man and animals, and is widely distributed.

Will You Air Condition Your Dairy Barn?

Air cooling livestock may well be worth the cost. It's coming sooner than you think . . .

Condensed from The Furrow

F. E. Charles

IF SHE could have talked, many a dairy cow might have said to her owner last summer: "Look, Boss, I just can't make milk when it's hot. I seem to lose my appetite, and when I don't eat, my milkin' apparatus won't work."

And, without knowing why, the old cow would have been talking sense. Farmers have long observed the effects of summer heat on milk production; also on the rate of gain by fattening cattle and hogs, and on the egg production of laying hens. Now, in this age of scientific approach, experiment stations are delving into the why and how of things. And, based on such research, along with common sense, some practical farmers are providing genuine air conditioning for farm animals.

Air conditioning a livestock building is no problem. The engineers know how. The only question is: Can it be made to pay?

It may look a little dubious right now, but that old dairy cow can just about count on it —there's an air conditioning unit in her future if she's in a hot-summer area. Estimates based on research show barn cooling can be made to pay a profit.

Seven years ago the U. S. Department of Agriculture and the Missouri Experiment Station began cooperative tests on animal housing. The things they've done, and learned, in 7 years fill books —how to provide artificial shade for cattle on pasture, what color to paint the shade, how color of hair and size affect an animal's comfort, why Brahman cattle can stand heat better, how much dairy production is reduced by high temperature, and so on and on.

The story is too long to cover all farm animals, so let's concentrate on dairy cows. Boiled down to simplest terms, the experiments show this: *With dairy cows, high temperature is the thing to fight.* Cold doesn't bother cows. They can take anything from zero to 70°F. with no apparent effects—if the animals are protected against wind and

Reprinted by permission from The Furrow, Moline, Illinois

moisture during low temperatures: but above 70°, or 75°, look out! That's where milk production begins to fall off.

Why? Well, the cow eats less, and milk flow drops, but the researchers don't know which comes first. It's like the hen and the egg. Does the cow quit eating because she's making less milk, or make less milk because she slows up on feed intake?

How much does production drop? An average Holstein cow will lose 16 pounds of milk a day when day-time temperature jumps from 70° to 90°. The men in charge of the studies are satisfied that the 16 pounds a day is a reasonable, dependable figure. With that as a starting point, they project the economics of temperature control for dairy cows in clear-cut figures.

How Much Cost? What Profit?

For easy-figuring, consider a 100-cow herd. (If it will pay for 100 cows, it'll probably pay for 50, but maybe not so well for 25. Air-cooling is bound to be expensive, therefore more efficient on a relatively large scale.)

Assume that you have a loafing barn to accommodate the 100 animals—a good barn that can be well insulated, the Missouri researchers say. Think in terms of average Holsteins, each producing an extra 16 pounds of milk per day by being housed inside at 70° instead of turned outside into 90° heat(higher temperatures would hurt production even more).

If each cow gives an extra 16 pounds, that's 1,600 pounds daily. Skipping details, this extra milk over a 60-day period is worth $3,480 at 4 cents a pound.

Now, for costs of cooling the 100-cow loafing barn. You'll need 35 tons of refrigeration at $500 per ton or $17,500 for equipment, including cost of insulation and installation. Operating the equipment should cost about $8.40 per day for a 10-hour day—or for 60 days, $504.

On an investment of this kind, it's wise to depreciate it at 10 per cent per year. That is $1,750 per year. Adding the $504 for cost of operation gives $2,254 total costs for the 60 days, or call it for a year, if you like. (The engineers figure the average year in Missouri has about 60 days when a dairy man would need to cool his barn. If there are more hot days than that, then the cooling system would merely pay greater profits.)

Recapped, the figures look so:

Value, in gain of milk...		$3,840
Depreciation ...	$1,750	
Operating cost..	504	
	$2,254	
		$2,254
		$1,586

The final figure, $1,586, is a

little better than 9 per cent on the $17,500 investment. Most anyone would be happy to put his money to work at 9 per cent.

Remember, the above calculation is on average Holstein cows. Higher - than - average producers should pay an even better return.

Needed Over Wide Area

The Missouri-USDA research men are convinced that barn cooling for dairy cows holds definite possibilities for large areas of the U. S.—from California eastward across the bottom half or two-thirds of the country. It is in this large area, particularly in the hotter southern states, where high summer temperatures have hurt the dairy industry.

Based on their 7 years of studies, the Missourians are inclined to this conclusion: "Keep your dairy cows in an air-cooled barn in hot weather and bring the green feed to them—during the day, at least. After nightfall, *if temperatures drop to around* 70°, let the cows out for night grazing—unless you prefer to chop all their pasture and haul it to them."

Keep Record of Farm Gas Purchases For Tax Refund

Farmers and ranchers should keep a complete record of gasoline used for farming purposes this year so they can take advantage of the federal tax refund. The bill, passed by Congress and signed by the President, is now law.

Claims for refund on gasoline used for farming between January 1 and June 30 may be filed any time after June 30. The deadline for filing claims for this period will be October 31.

After this, however, refunds will be made on the government fiscal year basis — July 1 to June 30. Federal form 2240 will be used for refund claims. This form is available from county agents, post offices and banks.

Custom operators aren't eligible for the refunds, but a farmer can claim a refund for his own gasoline used by a custom operator. Federal taxes on diesel and other motor fuels can be recovered. Farmers and ranchers are advised to keep adequate records in case their claims come up for review. *Colorado A. & M. College*

HUMUS — The Best Soil Conditioner

A leading authority explains the value of humus and tells how to maintain an adequate supply. Once-over tillage and chemical weed killers can help . . .

Condensed from American Agriculturist

Dr. Firman E. Bear, Rutgers University

SO FAR, nothing has been discovered that is superior, on a cost basis, to organic matter as a soil conditioner.

When fresh organic matter rots in the soil, slimy materials are developed by the soil microbes. These bind the soil particles together in much the same manner as it is done by chemical conditioners. When the soil dries out these slimy materials shrink, draw the soil particles together into crumbs, and hold them in this condition for some time. Once having dried out thoroughly, these slimy materials resist wetting, just as in the case of dried peat. Soils liberally supplied with rotting organic matter may remain in good condition and absorb the rain throughout an entire crop season.

But no matter how stable these crumbs are, they remain as such only as long as they are not destroyed by direct impact of rain or as they are not sheared off by farm machinery. The disc, the cultivator, the wheels of tractors and other farm machinery, and every hard or heavy tool that strikes the soil tends to reduce such granules to dust.

This calls for keeping implements off the soil as much as possible. It provides a good reason for substituting chemical weed killers for part of the cultivation. And there is growing interest in the use of once-over machinery that opens up the soil, applies the fertilizer, and plants the seed, all in one operation.

Continuous development of fresh organic matter for working into the soil is a highly important phase of good soil management. The cruder forms, such as cornstalks, straw, and grass sods, if worked into the soil, need to have manure or clover worked into the soil with them to speed up the rotting process. The manure and clover supply the extra nitrogen required to feed the

Reprinted by permission from American Agriculturist, Ithaca, New York

soil microbes. These microbes are mostly protein and they contain about 12 per cent nitrogen on a dry-matter basis. In lieu of manure or clover, enough fertilizer nitrogen should be added to raise the nitrogen content of the cornstalks and similar organic materials from around 0.75 per cent to about 2.5 per cent.

The best way to get more organic matter into the soil is to grow it there. This calls for liming the land and applying plenty of manure or fertilizer. And if some of the chemical soil amendments can be gotten down into the subsoil below ordinary plow depth, so much the better. Manure does best when worked into the soil to a depth of only 3 to 6 inches. But chemical fertilizers can be plowed under or put down into the subsoil with good effect. The more fertilizer applied, the bigger the crops, and the larger and deeper their root systems.

Different kinds of roots do different kinds of jobs. Fine grass and clover roots are excellent for developing soil crumbs in the plow depth of soil. Alfalfa taproots are more effective at greater depths, and they leave channels behind for air and water movement when they die and rot. A combination of grasses and alfalfa is hard to beat for improving the water-intake and water-storage capacity of a soil.

Oat Silage Compares With Legume - Grass Silage

Oat silage is apparently here to stay. Researchers say three years of experimental work show you can successfully harvest oats for silage and increase your income.

The University of Illinois tested oat silage with nearly every class of feeder cattle and was never disappointed with results. For anything but full-fed cattle, oat silage is equal to or slightly better than legume-grass silage. The low energy content of oat silage makes it less well suited for fattening heavy cattle or feeding limited-grain-fed cattle.

Harvesting the oat crop as silage gives young legume-grass seedlings a break, too. Seeding oats in 14-inch rows lets more light get to young plants. Early harvest also cuts down competition for light and water. —*University of Illinois*

How To Forecast Farm Prices

In this printed interview, a marketing expert tells how he prepares his forecast. Ten state and regional farm magazines carry his marketing column . . .

Condensed from The Young Farmer

An interview with *Gilbert Gusler,* Agricultural News Service, Inc.

IN YOUR opinion, Mr. Gusler, what kind of specific market information is most important to the farmer? What are the basic things he has to know if he is to plan his crops and his marketing to best advantage?

I'd say there are three definite types of information every farmer needs. First, he has to know something about the longer price outlook for the products he raises. A farmer has to decide what crops to plant, how many acres of each, and how much livestock and poultry to keep if he is to obtain the best returns from his farm or ranch.

Too often, these decisions are based on current prices rather than on those likely to prevail at marketing time. To make the right decision, he needs information on supplies on hand or in warehouses, an idea as to what other farmers are planning to do, and a long range weather estimate. Second, he needs to know when he should plan to market his crops and livestock. What time of year should his cattle and poultry be ready for market? Should he sell his crops at harvest or store them for future sale?

And, third, the farmer needs to know current prices and price trends when he sells so that he will be on an equal bargaining basis with the buyers. If he has a choice of more than one market, he should know which market is likely to pay more for the particular class and grade of product he has to sell.

Your job, then, is to get this information to the farmers?

Yes, but I want to add a word of caution here. No forecaster can tell a farmer exactly what to do. Our reports give some specific marketing suggestions but we feel our main job is to indicate the probable trend of prices based on the information we get from our numerous sources and out statistical studies. Then we

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think the farmer should apply the forecast to his own specific situation. With the exception of the weather and spot prices at selling time, we can give the farmer just about everything he needs for planning his operations.

What about the weather? Can the farmer adjust his marketing to the variances of the weather?

That's a tough one to answer —and the answer may seem to be contradictory. First, the farmer should remember that the weather can seriously upset forecasts by bringing unusual surpluses or shortages. That's why the market reacts sharply to weather news.

On the other hand, farmers are learning to "do something about the weather" by strip cropping, contouring, and dry land farming practices. That's why you'll often find bumper crops following premature predictions of crop failures.

The farmer should keep both these facts in mind—and should weigh them in determining the overall picture of crop conditions. He should *never* try to judge market prospects by centering his attention on the weather conditions in his own area.

What factors do you take into consideration when you prepare a marketing forecast? What things do you feel you have to know before you can tell the farmers what prices are likely to do?

That's a big question. I'll give you some of the things we feel are essential but first I want to say there are countless factors which affect markets. Some of these factors, of course, weigh more heavily than others, but I doubt if the average person realizes how many forces come into play to raise or lower the price of hogs by just one cent. A partial list of factors that we study would include crop and livestock production estimates, market receipts, livestock slaughter, cold storage stocks, commercial stocks of grain, rates of usage in the United States, exports and imports and size of crops in foreign countries, the level of industrial production at home and abroad, urban employment, consumer income, long and short range changes in consumer diet preferences, and historical seasonal price.

Of course, political developments have a lot to do with prices these days so we keep a sharp eye on everything that comes out of Washington. We are also constantly on the lookout for abnormal influences that may throw the average supply and demand factors out of line. An example of this would be a severe black rust outbreak, war, end-

ing of war, sudden business boom, or depression.

Where do you get all of this information? You certainly can't collect it yourself—or do you?

Thousands of men work for all taxpayers in the collection of these statistics. They are the men who put out the reports issued by just about every governmental agency. We depend largely upon reports from the U. S. D. A. and the Department of Commerce.

We also get many daily and weekly market reports from agri-

To have known the best, and to have known it for the best, is success in life.—John W. Mackail.

cultural colleges, trade publications, private businesses, and private price forecasting agencies.

From what you've told us, we visualize you as being snowed under with a barrage of paper. How do you manage to correlate all these facts and boil them down into your market reports and forecasts?

Well, sometimes we *are* almost snowed under. Our lifesavers are our charts and statistical tables. Charts make it possible for us to keep a lot of information in a compact, easy to read form. We keep a variety of charts on many commodities. For example, let's take a look at charts we keep on current prices. When new pricing information reaches us, we post it on the chart and we can see at a glance how the prices are moving. The chart is quick to show definite trends as well as predictable peaks and valleys.

When we expect a change from a declining to an advancing market, as in the case of wheat prices during the summer or hog prices during the early winter, the daily price charts tell us when the change is actually taking place. Charts are not infallible, however, since prices often make false starts before they finally settle into a trend.

The information we can't chart or tabulate is kept in our files until it becomes obsolete. Of course, we learn to carry a lot of general information about each commodity in our heads.

We hear a lot of talk about "historical cycles" in the production of farm products. Does history actually repeat itself in a predictable manner?

History definitely repeats itself and is a great help to the forecaster, although it is a danger, too, because history doesn't repeat itself exactly. Two good examples of production cycles are those for hogs and cattle. Hogs

generally run in three to five year cycles, while cattle cycles take 11 to 15 years from high point to high point.

Cycles repeat themselves because many farmers base their production plans on current prices. For example, the hog farmer who sees high prices, stocks up on breeding sows in the hope that the same high prices prevail when his litters are ready to sell. This builds up a huge supply of hogs until the price is forced to break, as it has this year. This usually forces many farmers out of the hog business the next year, the supplies drop, prices go up, and the cycle starts all over again.

Seasonal prices also follow seasonal patterns, but these vary with the conditions that dominate the particular season. For example, fat cattle prices decline faster from spring to fall when corn is cheap than when corn is high priced. If we can study records of several years with conditions similar to the year we are in, forecasts can be made with surprising accuracy.

All this sounds like it would be possible to work out a fool proof system for marketing if you just chart the cycles and increase production to hit the top of the curve. Is this possible?

Only in theory. There's no doubt that smart farmers can, and many do, use the cycles, but a foolproof system is not in the cards. You'll notice I said before that cycles don't repeat themselves *exactly*. That's where the trouble comes in. There are always unpredictable factors which may throw the cycle off for a period of a year or more. And don't forget, either, that the increased return from selling when prices are highest is not all clear profit. You may have to pay out more in feed and in labor costs to hit the market just right.

What would you suggest farmers do to improve their marketing practices?

First, I'd suggest that farmers learn more about their markets and pay close attention to the market reports in the daily papers and farm publications. Farmers should keep an eye on the cycles and adjust their production on the basis of probable prices at market time instead of current prices. They should try to sell more in periods of seasonal price strength. And they should do some selling when prices have had a sharp rise rather than holding back in the expectation of a better price.

In general, farmers should sell when they figure to make a good profit on their commodities; gambling on more than that is

risky. And farmers should be sure they are producing the qualities and grades the markets want.

All this does not mean being an in and outer—going against the crowd. It means making moderate changes in volume that will not greatly disrupt operations, having less than full production for sale when markets are glutted and more than normal supplies when prices are high.

Above all, the farmer should make his own marketing decisions. Market forecasting is far from a perfect art and the farmer should temper all forecasts with his own judgement. I believe that any farmer who does these things will, in the long run, sell his products above the average prices and much over the low levels reached.

One more question, Mr. Gusler, how long have you been at this business of forecasting markets?

I first started devoting all of my time to market forecasting in 1920. I have been in the business ever since then with the exception of the war years when I worked for the government in the meat and livestock branch of the Office of Price Administration. Previous to 1920 I attended Ohio State University, majoring in animal husbandry. I also taught at Ohio State and the University of Illinois for several years and did some work on livestock marketing problems with the government.

Crossbred Gilts Mature Earlier

That's what the records of more than 500 gilts in the Wisconsin swine breeding experimental herd show. A group of University of Wisconsin livestock research workers kept detailed records of age at first heat for all gilts in the herd for the past four years.

Different groups of gilts varied in age at sexual maturity. The averages ranged from as early as 184 days for some to as late as 258 days for others. Inbreds were definitely older than linecross gilts at the first heat, and purebreds were older than crossbreds.

There were differences between breeds, too. Poland China gilts matured at 200 days, while the average time of first heat was 242 days for Durocs and 267 days for Yorkshires.

These differences aren't merely because the linecross and crossbred gilts were larger, according to the research workers. The figures were the same when gilts of similar weights were compared with each other. *Wisconsin Extension*

How to Hold High Powered Legumes

Fertility plays an important role in maintaining legume stands . . .

Condensed from Pennsylvania Farmer

James H. Eakin

FARMER SMITH has held Ladino clover for 12 years, Farmer Jones never held Ladino for more than three years.

Likewise, how often do we hear this, "My grandfather grew and held alfalfa stands for ten years; I can't hold alfalfa, I can't even grow decent alfalfa on the same fields." These problems show the vulnerable side of a successful grassland program. Past failures of forage crops have been blamed on the moon, hard winters, poor seed, wet feet and other causes too numerous to mention. Actually, lack of balanced fertility, poor seeding methods and management of the stand are the real culprits.

Many farmers fail to establish good stands of forage crops because they fail to meet the exacting soil fertility requirements of these crops. In dry years seeding failures are all too often blamed on dry weather, although in any community one can find excellent stands of legumes. The farmers who obtained these good stands were not just lucky. There was a reason why they succeeded, and reasons other than drouth, why some failed.

Soil acidity is often the reason for poor performance of forage crops, or most other crops. If your farm is located in an acid soil region there is an excellent chance that legumes are not doing well because they refuse to grow on acid soil. Just make sure with a soil test that these lime needs are corrected. Any field on your farm that has a pH below 6.0 is a potential money loser. For best results, keep that pH between 6.5 and 7.0.

A second important reason for poor legume growth is a lack of adequate phosphorus in the soil. In the old glaciated area of northwestern Pennsylvania phosphorus is critically low. Over 90 per cent of the soils in this area are low in phosphorus. These fields should receive at least 100 pounds per acre of

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phosphoric acid (P^2O^5) at the time of planting legumes. On a prepared seed bed for wheat or oats to be seeded down, one should drill deeply or plow down 500 pounds per acre of 20 per cent superphosphate plus the regular grain fertilizer at planting time. In many cases potash is just as low as phosphorus and an 0-20-20 fertilizer should be used. Potash supplies are quite variable.

Giving feminine names to hurricanes is highly appropriate. Most of them run around in circles trying to make up their minds what courses to take.

A lot of people blame winter killing on their failure to hold legumes. This is true in some cases, but untrue in the majority of cases on low potash soils.

Generally speaking farm manures have kept Pennsylvania soils as productive as they are today. Commercial fertilizers have helped greatly, but without the help of manure we would have a great deal more abandoned land than we find today. The liquid portions of manure contain about 75 per cent of the total potash found in manure.

Why is it then, that we find so many low potash farms in Pennsylvania? One can only guess, but if a lot of the liquid portion gets away before manure reaches the field, potash will be lost. Adequate bedding is one answer. One should use about seven to nine pounds of long straw per cow per day or about one-half bushel of dry sawdust per animal.

If there ever was a weak spot in our grassland program the method of seeding is one link in the chain that needs attention. One can lime the field, prepare a good seed bed, use good seed, plenty of fertilizer and then end up by literally plowing the seed under. Legume seeds cannot be buried under more than one-quarter inch of soil and still come up. The cultipacker seeders have done a good job for us, but most farmers are not equipped with these special seeders.

However, almost all farmers can be equipped to "band seed" their legumes. Band seeding is one of the greatest advancements made in agronomy in the last 15 years. This equipment can be homemade, or custom rigs can be purchased from almost any farm machinery store today. Many seed, feed and fertilizer dealers also handle band seeding attachments for the grain drill.

As soon as the grain is combined the straw can be handled in two ways, (1) the stubble can be clipped at once and everything removed or (2) the loose

straw can be removed and stubble hay made later in the season. Weeds should always be clipped low. Wait until the weeds look as if they will damage the new seeding then set the cutter bar low and clip. If these rough annual weeds are clipped high, you just prune them, but they won't be killed.

Don't be afraid to cut legumes low during the seeding year. They all recover from ground level except sweet clover which recovers from buds on the stems. If weed growth is heavy it should be removed. Clip weeds only once or you might injure the stand.

Generally speaking, forage crops will benefit more from top-dressed applications of potash than phosphorus. This is true because phosphorus is slow in leaching down to the feeder roots. Phosphorus is still of great benefit top-dressed on forage crops, but is most efficiently used by deep placement when the legumes are planted.

A system which has worked very well is to work 0-20-20 or its equivalent into the seed bed before planting and then at the end of each hay cutting year again top-dress with 400 pounds per acre of 0-20-20, 0-15-30 or their equivalents.

Research has shown that a split application of fertilizer is best. This would mean applying 200 to 300 pounds per acre after the first crop is removed and then applying the same amount in the fall.

The split application is primarily used because of the plant's feeding habits for potash. A legume plant uses potash not in proportion to its needs, but in proportion to what is present in the soil. If there is a lot of potash present the plant will probably use more than it needs. This feeding habit might be to the detriment of the next cutting.

Shortcut For Cow Testers

It's more important to know the milk production of individual cows than the butterfat test. Extremes in variation are five times greater in milk production than those of the butterfat test. The average fat percentage of the milk of one complete lactation is a good indication of the test during subsequent lactations, say Purdue University dairymen.

A chain is no stronger than its weakest link. These are the links: a soil test, lime, fertilizer, adapted certified seed, innoculation, band seeding, weed control by clipping, insect control, maintenance fertilization each year, cutting at an early stage, proper harvesting and storage.

Pelleting Hay Nearly Doubles Feed Value

Experiments show amazing advantages for hay fed in pellet form. Needed now is a good, low cost field pelleting machine.

Condensed from This Week at Dixon Springs

PELLETED hay fed to steer calves was worth $15.68 a ton more than the same hay fed long or chopped in experiments last winter.

George Cmarik, extension cattle specialist at the Dixon Springs Experiment Station of the University of Illinois, reports that steer calves fed pelleted hay gained 206 pounds over a 119-day feeding trial. Average daily gain for these calves was 1.7 pounds.

At the same time, similar calves fed long hay gained 75 pounds a head, on the average, and those fed chopped hay gained 74 pounds for an average daily gain of about .6 pound.

Calves fed the same forage put up as silage gained only 5½ pounds during the test. After 28 days on silage alone, these steers lost 48 pounds a head because they couldn't eat enough of the high-moisture silage. Station researchers added five pounds of chopped hay daily per head to get any gain at all, but the gains still were not satisfactory.

Cmarik points out that pelleted hay is a highly concentrated feed, and the steer calves apparently liked to eat it. They ate an average of 15.7 pounds of the pellets a day. That's about 3.5 pounds more feed than you'd normally expect steers of their age and weight to eat. Every 15.7 pounds of pelleted hay contained 14.3 pounds of dry matter.

Steers on pelleted hay needed only 826 pounds of dry matter to put on 100 pounds of gain. The pellets produced 174 per cent more gain on 50 per cent more total feed eaten.

Steers on long and chopped hay ate 9.5 and 9.3 pounds of dry matter a day in 11 pounds of total feed. Dry-matter intake was about 1.5 pounds below recommended daily amounts. Steers on silage and hay ate 6.1 pounds of dry matter in 17.6 pounds of daily feed and barely maintained their weight.

Reprinted from a farm news release prepared at the University of Illinois, Urbana, Illinois

The most important part of this trial to beef feeders, Cmarik says, is the difference in cost of gains of the calves wintered on loose hay and on pellets. With hay figured at $20 a ton and no charge for pelleting, steer gains on loose hay in this experiment cost 17.2 cents a pound compared with 9.1 cents a pound for gains on the pellets.

Included in this test were 60 steer calves from the grade Hereford herd on the Station, divided into four equal lots by weaning weights. A mixture of timothy and alfalfa was fed, the greater proportion being timothy. The silage was cut at the same time as the hay. It was from the same field, in alternate strips, and was ensiled in an upright concrete stave silo. All the hay was baled.

USDA reports say that the portion of the consumer's dollar spent for pork decreased from 3 cents in 1947 to 1.9 cents in 1955.

In fattening rations for lambs, pellets have given feed savings varying from 9 to 26 per cent and have increased rates of gain by 8 to 55 per cent. In all trials, four different fattening rations for lambs and one for cattle, pellets were superior to the same feed in the form of meal. We knew pellets were big, but we didn't know how big until this past winter. Previously the cattle had been fed complete fattening rations including both concentrates and roughage.

Feeders will have to add a pelleting charge to their cost if they pellet hay. That cost will vary with the situation and may in some cases be high enough to offset any pelleting advantage.

Pelleted feeds usually cost from two to three dollars more a ton than the same feed sold as a meal. Results of this experiment indicate that a ton of pellets is worth 104.5 more pounds of gain than one ton of the same hay either long or chopped. At a conservative price of $15.00 a hundred pounds for steer calves, this additional 104.5 pounds increases the value of the pelleted ground hay from $20 a ton to $35.68.

In terms of bulk, pellets are small. Those fed on the Station have been about as big around as a lead pencil. They are made by subjecting finely ground feed to steam and extreme pressure. The feed comes out through holes in the pelleting machine as a dense, hard core. So far as we know, the feed does not change except in physical form. Yet these pellets pack a wallop.

The most often-asked question is: "Why?" if the feed is changed only in form. Digestibility does

not seem to be a factor. Perhaps it is partly due to greater consumption. At any rate the greatest benefits for pelleting have been for lower quality rations. Cattle eat pellets with more relish than the feed in meal form.

A certain amount of feed is needed just to maintain life. Feed eaten above that point can be used for growth and fattening. Pellets eliminate dust and waste. They are easy and fast to eat and swallow. They need less time to fill the animal and perhaps a sheep or a steer is full before he knows it and just keeps on eating. But, regardless of the reason, pellets do the job.

Slatted Floor Best For Mow-Drying Hay

Mechanical hay drying is gaining popularity in Wisconsin. Orrin Berge and H. D. Bruhn, University of Wisconsin farm engineers, report that Wisconsin farmers now have nearly 3,000 hay drying units in their hay mows.

Hay drying units take a lot of risk out of haymaking and help save hay quality, say Berge and Bruhn. Field cured hay must be dried to at least 25 per cent moisture before it's hauled to the barn. That means leaving the hay in the field for as long as two days, with more chance for the hay getting rained on and losing the leaves.

Barn dryers mean more hay per acre, because they save more of the leaves. With a dryer in the hay mow, hay can be hauled in at 30-35 per cent moisture — in good weather — after just a half day of drying. The engineers list four ways to dry hay artificially — wagon dryers, drying buildings, silo-type hay dryers, and mow drying units.

Mow drying systems are most practical and popular. Berge and Bruhn recommended a fan unit — with or without heated air — and a slatted mow floor. With this arrangement, air is blown under the floor and up through the hay. Heating the air isn't necessary, but drying with unheated air takes longer.

Complete drying units cost around $1500 for most barns, but improved hay quality should pay the difference in a few years. You can usually figure that it costs about two dollars per ton of hay to pay investment and operating costs for a dryer.

University of Wisconsin

The Why of Bull Failure

A sound and helpful article dealing with a familiar problem . . .

Condensed from Ayrshire Digest

Dr. David Bartlett, D.V.M.

WHEN A BULL is suspected of failing to reach or maintain the expected level of efficiency and performance, it is time to look into the matter of the bull himself, the females with whom he is being mated, and the conditions under which the matings are carried out. Fertility failures are costly, as every livestock breeder knows.

Viewed broadly, there are three major types of 'bull failure.' These are:

1. *Potency failure.* — Potency is quite different and distinct from fertility, since potency relates only to a bull's desire and physical ability to perform his part of sexual union. It is not unusual to find a bull fully potent, while hopelessly sterile, as would be the case should his testicles be producing only abnormal sperm or should the tubes from his testicles have been plugged by disease, or cut. On the other hand, a bull hopelessly crippled with arthritis and unable to serve, may continue to produce ample quantities of high quality semen.

2. *Fertility failure.* — Fertility relates to a bull's ability to produce semen that, when deposited in normal cows, is capable of initiating pregnancies at a reasonable rate. Fertility implies the ability to produce normal volumes of semen, with normal numbers of sperm, at a normal rate.

3. *Failure due to certain infectious diseases transmissible from infected bulls to susceptible females.* — Infection within the uterus may either kill already developing calves or act for many months to prevent females from becoming or remaining pregnant.

Each of these failures is relatively distinct. Different organs, groups of organs, or body systems may be involved, and distinctly d i f f e r e n t under-lying causes or failures may be responsible.

Sometimes, of course, more than one type of failure, either related or unrelated, may be present at the same time. An obvious example would be in the case of

Reprinted by permission from The Ayrshire Digest, Brandon, Vermont

acute infection of the testicles. Sperm production would be affected, but the associated pain would be expected to make the bull unwilling to serve.

Potency Failure

In considering failure to serve, one should immediately separate unwillingness or refusal to serve from inability to serve.

Unwillingness to serve because of lack of desire is rarely the result of temporary lack of male sex hormone or of the primary hormone that stimulates production of the male sex hormone. When these hormones are lacking, it is usually a lifelong condition. Since hormone injections can be expected to provide only temporary improvement of any situation, their usefulness for this, and other reasons, is definitely questionable. Generally speaking, results from hormone 'shots' have been very disappointing.

Extreme fatness or lack of condition may diminish desire. The necessity and manner for correction of these faults is obvious.

Probably, most frequently, unwillingness or hesitation in serving is the direct result of psychological attitudes of the bull. For example, the bull may have come to associate pain with service or in some 'bullish' way, an unpleasantness or dissatisfaction.

Sometimes a cause for pain will be revealed by careful examination. Reluctance to serve may continue a long time after cause for pain at service has ceased.

The importance to the bull of good handling and surroundings at service cannot be overemphasized. This becomes particularly obvious in bulls used in artificial insemination, where a new man making the collection, a new place of collection, or a move to a new stud, results with surprising frequency in prompt resumption of willingness to serve after a period of indifference or refusal.

An archeologist has dug up a 16-inch egg he can't identify. It's no good for cooking or hatching, but fine for wondering about.

It is quite apparent that there are great variations in level and patterns of sex drive in bulls. That heredity plays a major role in determining the level, pattern, and persistence of sex drive is pointed out by studies with identical twin bulls. Nevertheless, from the practical standpoint, competence in the handling and management of bulls is probably the most important single factor in preserving a bull's willingness to serve, or in attempting to restore willingness in an otherwise normal individual.

Numerous conditions may result in inability of bulls to serve

even though they are willing. In aged bulls, arthritis of several or a single one of the joints may be responsible. Sometimes such a condition may be improved temporarily with one of the newer remedies.

Injuries, adhesions or tumors of the penis may distort or otherwise interfere mechanically with entrance of the penis into the cow. Surgery may provide the answer to such difficulties. Spasms of the retractor penis muscle, preventing full extension, and abnormal shortness, or curvature of the penis sometimes occur, but are rare.

Before undertaking to correct conditions that interfere with a bull's accomplishing satisfactory service of cows, one should consider carefully the possibility of perpetuating undesirable hereditary traits. Indifferent sex desire, as well as abnormal shortness of the penis, muscle spasms interfering with extension of the penis, and curvature of the penis may be on an hereditary basis.

Recently, several research workers have been studying the possibilities of collection of semen from male animals by electrical stimulation, in order to bring about ejaculation of semen without service of a female or artificial vagina. This method is being adapted to bulls and holds promise of salvaging the usefulness of impotent but normally fertile bulls from which semen cannot be obtained by usual, more natural procedures.

Fertility Failure

Fertility failure comprises the largest and most complicated group. The only certain measure of a bull's fertility is the efficiency obtained in the group of normal females currently being bred to him. This should approach an actual settling rate of 1:1.5 in natural service and a non-return rate to first service at 60-90 days approaching 70 per cent, in well managed artificial insemination.

Despite the fact that the final test of fertility is the breeding record, there are certain standards to be expected in a bull's semen. Failure to meet these standards provides a reasonable basis for prediction of fertility failure.

Examination of a bull is not complete without an examination of a sample of semen collected with an artificial vagina, whether the bull's fertility is in question, or his apparent normal fertility is to be confirmed. Generally, normal ejaculates from a sexually stimulated bull, after several days of sexual rest, may be expected to range in volume from about four to ten cc and contain at least 1,000 to 1,500 million sperm per cc (about 100 million per drop) of which 60 per cent to 80 per cent of the sperm

should be vigorous and actively motile.

Factors that can depress a previously normal semen picture are numerous. Certain of them are quite transient and uneventful improvement occurs within a few weeks. Generalized sickness, particularly when accompanied by high body temperature, certain drugs, and extremely hot weather, may work harm, usually temporarily, upon sperm production. On the other hand, there are conditions that damage sperm production from which there can be little or no recovery. Among these are damage to the testicles from bruising or punctures, infection with inflammation and swelling (often completely an inside job). In such cases, the organs usually shrink and harden later. The sperm producing tubules may wither away and the conducting tubules may be blocked.

Some bulls are just not born with all 'standard equipment.' In fact, several research workers have determined that up to four per cent of the bulls lack full development of some part of the genital apparatus! Complete absence of one or more parts is not unusual. Such defects decrease the bull's fertility, but, unfortunately, affected bulls are not always totally sterile. For the good of the cattle industry, such animals should never be used for breeding purposes. In Sweden, the appearance, within a certain breed, of a condition of failure of one or both sex glands to develop, in both males and females, went unchecked until it reached a point where 30 per cent of all the animals in herds that could be examined had but a single normal sex gland and five per cent had none.

It is obvious that all of the essential nutritive elements must be present in the ration in ample quantities for normal and efficient growth, production and reproduction and that there must never be a time in the life of an animal when these essential elements are not supplied.

It is widely accepted that high quality roughage in the form of good pasture, properly cured and stored hay or silage crop that has been cut at the right stage of maturity, and grain mixtures fed in proper quantities, provide, if grown on non-deficient soils, all essential nutriment. As assurance against absence of mineral elements that may be lacking because of soil deficiency, the feeding, free choice of trace mineral salt and steamed bone meal, separately, is recommended practice. There is no single nutritional factor that will improve fertility through feeding in unusual or excessive quantities.

Bulls need only to be fed in

accordance with the above principles. However, it is well to remember that the bull, because he so often never has access to pasture, being housed separately, deserves the best possible hay. His more restricted ration entails a greater possibility of nutritional deficiency, particularly in vitamins A and D.

How early a bull is ready for service is determined largely by his heredity and the level of nutrition during his calfhood.

The best way to clean dairy cow udders before milking is a thorough rinse with plain water which is not to be re-used, followed by whiping with a wet cloth soaked in a weak chlorine solution, according to specialists.

Light service at 12 to 15 months can be expected to give good results and is, of course, without danger to his future. Many old bulls lose their potency before their fertility.

Extreme frequency of use of a bull results in exhaustion—exhaustion of sperm available for ejaculation and exhaustion of his desire to serve. However, recovery of both functions is rapid and with no lasting, harmful effects. Under conditions of natural service, two or three single services per week are a reasonable load for mature bulls. High fertility should be maintained at this frequency. Under conditions of hand breeding, two services of the same female can be justified only after an extended period of sexual inactivity.

Often one hears the idea expressed that moving a bull by truck or railroad may result in his becoming temporarily infertile, or may even result in sterility. Detailed research involving many bulls that were moved between A. I. studs, hundreds of miles apart, the 'before' and 'after' fertility being measured by non-returns, has indicated that no detectable harm to fertility resulted from such moves.

Infectious Diseases

Bovine venereal trichomoniasis is a relatively rare disease of cattle in the United States. However, it does occur in numerous herds every year and when it does, the loss is considerable. This disease is the best known example of one that is harbored permanently by the bull ,and is transmitted at sexual contact to the heifer or cow. If she is susceptible, the infection flourishes, kills the developing calf, if one is present, and renders her infertile for up to six months.

This infection does not act by interfering with the bull's sperm production or with fertilization of the egg of the female; rather, it

prevents the continued growth and development of the fertilized egg within the female.

After about six months, the infected female recovers spontaneously and is immune to reinfection, usually for several years. During this period of immunity, females settle at a normal rate even when bred to an infected bull.

Control and eradication of this disease centers in the bull. Today, this infection may be diagnosed in the bull with reasonable ease and accuracy and the infection, if present, may be treated with a high degree of success, though with considerable effort.

Under conditions of natural breeding, trichomoniasis is transmitted almost exclusively on a sex contact or venereal basis. Under conditions of artificial insemination, the disease is also transmissible, but at a far lower frequency.

Only recently has it become apparent that bovine vibriosis, characterized by repeat breeding, is an important cause of infertility in the female. The more dramatic and longer known manifestation of this infection, midterm abortion, is now known to be the exception rather than the usual.

Further, only recently has it become clear that vibriosis is harbored by the bull and that this infection is transmitted most usually on a sex contact or venereal basis. Unfortunately, simple diagnostic methods for the bull are not generally available.

Control of this infection within the herd and treatment of individual bulls and cows has not yet emerged from the experimental phases. Simple diagnostic methods for the bull are not generally available. Effective prophylaxis is possible through treating semen with antibiotics—penicillin and streptomycin. The semen must be collected by means of an artificial vagina, added to a diluter containing the antibiotics, and the mixture held for not less than six hours before use. Such a precedure has been shown by research methods to be remarkably effective.

In bulls, brucellosis is a very rare though, when it occurs in clinical form, very important problem. The infection is highly destructive to the semen-producing organs of the bull.

Although transmission of brucellosis does not ordinarily occur between the sexes by sexual contact, Danish workers have shown that semen from some brucella-infected bulls, if used in artificial insemination, will transmit brucellosis to females at a high rate.

Blood testing and semen testing for brucellosis is essential, particularly so when a bull's semen is used in artificial insemination.

How to Preserve Cured Pork

Anyone planning on curing pork would do well to chill the carcass immediately after slaughter. That will prevent loss of quality. But, once the carcass is chilled, delaying curing up to four days won't hurt the quality, and in some cases it may improve it.

Those facts were brought out in a research study on ways of preserving cured pork at the University of Arkansas' Experimental Station. Assistant Professor M. C. Heck summarized the high points of that study.

Four trials were run to determine the effects of delayed chilling and curing on the quality of pork hams and shoulders. A dry salt cure, a dry sugar cure, and a special Smithfield dry cure were also compared. After the cuts had been chilled and cured, they were cooked. Five judges then taste-tested slices from the center cuts for aroma, flavor of lean and fat, texture, tenderness, and juiciness.

When the pork carcasses were left at room temperature for four hours before chilling, the skin became dry and brittle, and spoilage occurred during smoking. The amount of spoilage was about the same in hams and shoulders that were salt-cured and sugar-cured.

However, when the carcasses were chilled within an hour after slaughter and then held in the chill room for four days before they were cured, there was little spoilage and no ill effect on the cured meat. In one of the trials, the meat dripped or bled during this delay, and lost considerable juice. Even so, cuts that were treated with sugar cure and with the special Smithfield cure (which included salt, sugar, saltpeter, and flavorings) were tenderer and had better texture than similarly cured cuts that had not been chilled for the four-day period. Cuts cured with the special cure also showed better aroma and flavor of lean. It seemed that the sugar was beneficial to the cuts that had dried and hardened in the chill room. That was not true of the salt cure.

As Professor Heck points out, there was a strong indication that delaying the application of cure to pork cuts that are to be treated with a sugar cure may result in meat with a better taste. But curing cannot be delayed too long. When carcasses were held for as long as seven days (168 hours) in the chill room, they lost much of their external quality. The shanks became wet and slippery, exposed fat became rancid, and the carcasses were stale.

Single copies of Bulletin 559 are available from the Bulletin Room, University of Arkansas College of Agriculture, Fayetteville.

OASI - Your Social Security

How to take advantage of Old Age and Survivor's Insurance, otherwise known as Social Security. It has a great deal to offer you and your family . . .

Condensed from Michigan Farm Economics

Arthur Mauch

OASI means Old Age and Survivors' Insurance. This is not a relief program. You pay taxes as premiums.

Three kinds of benefits are provided by OASI:

1. Monthly retirement benefits to insured persons and specified dependents, see table;
2. Monthly survivors' payments to the families of deceased insured persons, see table;
3. Lump-sum payments of $90 to $255 upon the death of the insured person.

You can retire when you reach the age of 65 and receive benefits if you have qualified. You will be eligible for benefits by making payments for a minimum of 2 to 10 years. The important thing is to make application as soon as you are eligible for benefits. If you die either before or after retirement your family should get in touch with your Social Security office right away to arrange for survivors' benefits.

It is not possible to discuss all the details of OASI in a short article. Publications are available at your Cooperative Extension Service office and at your Social Security office. (Your postmaster can tell you where it is.) The rest of this article will briefly outline the things you should do right now about social security.

Who Is Covered?

The program is compulsory and applies regardless of age. All farm workers, including domestic help, who are paid $100 cash or more in a year by an employer are included. Exceptions are the employer's family (sons and daughters under 21, father, mother, wife, husband), turpentine workers, and Mexican or British West Indies contract workers.

Every self-employed farmer who has net farm earnings of $400 or more in a year is also included and must pay the tax. If

Reprinted from Michigan Farm Economics, Michigan State College, East Lansing, Michigan

your net is less than $400 but your gross is $800 or more, you can choose to be covered if you are reporting on a cash basis—it is not required, though.

How Much Is the Tax?

If you are a farm laborer your employer withholds 2 per cent of your pay and adds another 2 per cent himself for your earnings between $100 and $4,200. Make sure you have a social security card.

If you are a self-employed farmer you pay a 3 per cent tax on your net earnings up to $4,200 a year. Thus, the most you have to pay until the rate is increased is $126 a year. This is included as a part of your income tax payment. Neither rental income nor capital gains or losses can count as income.

In order to become covered, or to increase your benefits, these are some options you should know about if you report income tax on a cash basis:

1. If your gross income from the farm is $800 to $1,800, you may report on half the gross or on the net, whichever is larger.
2. If you gross more than $1,800 and your net is less than $900, you may report $900.

If you report on an accrual basis, it may pay you to shift to a cash basis in order to qualify for these options. Approval for this must be requested of the Commissioner of Internal Revenue sometime during the first 90 days of your tax year.

These options are not available if you operate as a partnership.

Examples of Monthly Benefits Payable to Qualified Persons

Average annual net income	RETIRED PERSONS		TO SURVIVORS		
	Worker	Worker and Spouse	Widow, child, etc.	Widow and 1 child	Widow and 2 children
$ 400	$30.00	$ 45.00	$ 30.00	$ 45.00	$ 50.20
1,200	55.00	82.50	41.30	82.50	82.60
1,800	68.50	102.80	51.40	102.80	120.00
2,400	78.50	117.80	58.90	117.80	157.10
3,000	88.50	132.80	66.40	147.80	177.20
3,600	98.50	147.80	73.90	132.80	197.10
4,200 and over	108.50	162.80	81.40	162.80	200.00

Will the Young Farmer Gain?

For some farmers and farm workers it is a long time until retirement. As long as you net more than $400 in any year you must pay the tax. If you die, however, your survivors will benefit according to your average income while you were covered, if you had made enough payments to qualify. An example will illustrate how important this can be:

A young farmer or farm work-

er, age 33, is killed in a farm accident. The survivors are his widow, age 31; one child, age 8; and one child, age 10. The husband's social security status was that of being currently insured, and his average yearly earning record was $2,400.

The monthly benefits for 8 years or until the oldest child reaches age 18 would be $157.10 a month or a total of $15,081.60. For the 2 additional years required for the youngest son to also reach age 18, the monthly benefit payments would be $117.80 or a total of $2,827.20. Thus the total benefit payments until both children reach age 18 would be $17,908.80.

Swine breeders and producers have some way to go in matching production of the "meat-type" hog with consumer eating habits. The average market hog produces enough meat for two persons and enough lard for three, according to the U. S. Department of Agriculture.

Then when the widow reaches age 65, if she is still eligible for social security payments, she would start receiving life benefits of $58.90 a month.

If You Are Near Retirement?

Certain farm management practices can influence the amount of tax a farmer will pay and the benefits that he may receive.

These suggestions apply for all farmers reporting income taxes on a cash basis. They are made specifically for farmers who were 63½ years of age or older on January 1, 1955, and who wish to qualify for social security benefits in 1956. Before adopting any of them, consider how they affect your farm business, both in the short and long run.

If you want to increase your benefits, it will pay to increase your income and, of course, the amount of your tax. Here are some things you can do:

1. Plan timing for sale of crops and market livestock.

a) Sell livestock before they become part of breeding herd, when they would become capital assets.

b) Feed livestock to heavier weights in 1956 — if additional gross is needed to reach $1,800.

c) If net farm profit for 1956 appears to be less than $4,200, sell cash crops and market livestock before or during last quarter of 1956.

2. If gross farm income or net profit is low, due mainly to a small volume of business, consider the following:

a) Increasing numbers of livestock—mainly cows and hens.

b) Renting additional land for cash crops.

c) Growing more high-value

cash crops, such as potatoes, cucumbers, and truck crops.

d) Using maximum applications of fertilizer to increase crop yields.

e) Doing custom work.

3. Reduce farm operating expenses by:

a) Selling excess pieces of machinery and equipment to reduce annual depreciation expense.

b) Deferring repairs on buildings and machinery where possible.

c) Utilizing unpaid family labor to the maximum.

d) Deferring purchase of new equipment.

e) Using as much home-grown feed in livestock rations as possible.

f) Deferring cash farm operating expenses (feed, seed, fertilizer, supplies, etc) to the following year by using credit instead of cash.

g) Changing rates of depreciation.

1. On grain storage—from 5-year basis to straight-line method.

2. On new construction and equipment, after December 31, 1954—from declining balance to straight-line method.

h) Electing to treat soil and water conservation costs as capital expenses if election was not made on 1954 income tax return to treat as an annual cash expense. These include:

1. Terracing and grading.

2. Drainage ditches and ponds.

3. Eradication of brush.

4. Planting of windbreaks.

5. District drainage assessments.

Fewer people on American farms producing more food than ever, adds up to our agricultural worker being the most highly financed in the world. Each of our 8½ million farm workers has an average capital investment of $14,000. This does not include such things as farm dwellings, household goods, savings, and automobiles which add another $5,000. The capital investment per worker in 1940 was only $3,500. Farm real estate used in production is now valued at $9,000 per worker as compared to $2,500 in 1940.

If for some reason you are not interested in the benefits and wish to decrease your taxes, using most of these suggestions in reverse will do this for you, too.

These things may not seem important, but remember—if you increase your social security tax base by only $50 a month while you are qualifying — you: (1) only increase your tax by $18 a year; and (2) stand to gain $15 to $35 a month for you and your wife as long as you live after retirement.

Financing Conservation Farming

Here are practical suggestions for planning and financing a shift to Conservation Farming . . .

Condensed from Soil Conservation

Buis T. Inman,
U.S.D.A. Agricultural Research Service

IMPORTANT to the farmer in deciding on the conservation plan he will adopt is how best to finance the changeover.

Conservation farming often means forgoing immediate income in order to increase future income. Such deferment of income can involve a critical decision, particularly for farmers whose resources are depleted or whose farms are small.

Answers to some of the questions regarding investment requirements, costs, added returns, and timing of costs and returns from soil and water conservation practices are being found through research.

On the rolling lands of central Indiana the choice of conservation cropping systems for 160-acre farms are limited. There, the most profitable cropping system, and one that provides adequate conservation measures, requires that half of the rolling land and a fourth of the level land be in forage crops. When less than half of the rolling land is in roughage crops, crop yields are reduced severely even though contour farming and grass waterways are used.

Feeder cattle and hogs, or dairy cattle and hogs, are the most profitable livestock systems. The livestock and cropping system recommended would increase the net income from a farm by more than $2,500 over that realized from a farm under the existing system. The farmer would need from $13,000 to $17,000 additional capital to make the changeover, depending on whether feeder cattle or dairy cattle were kept. This capital would be needed for repair and alteration of fences and buildings, purchase of machinery, lime and fertilizer, and increases in livestock, feed, and supplies.

Rather than provide for the additional investment from current income, ordinarily the farm-

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er would be better off financially to borrow money, make the changeover to a soil-conserving system of farming in a few years, and then repay the loan from his increased earnings. By borrowing, the final plan would be achieved more quickly and the debt paid off rapidly. The plan requires 11 years for all major farm investments. Cash farm income will be higher during this period except for 1 or 2 years in which purchases of fertilizer will be large.

Price of cattle in 1956 may begin a gradual cyclical recovery; sheep and lamb prices also are expected to average as high this year as in 1955.

Farmers on small farms and with relatively low incomes often experience difficulty in adopting a conservation system of farming. Frequently, by clearing a few acres of land or draining wet areas, they can overcome much of this difficulty. By improving more productive areas they can seed down erosive areas to pasture or have a smaller acreage of grain in the rotation.

Unpublished data for the Saginaw-Thumb area of Michigan indicated that only 62 per cent of the cropland was well drained. About 16 per cent needed a complete tile job and 22 per cent needed tile between present lines. Investments in tile of $100 per acre paid for themselves in 5 or 6 years through increased farm returns. Drainage increased per acre yields 60 per cent and also permitted the growing of higher-return crops. Cash-crop farmers were a long way from achieving the 20 per cent minimum of full-season sod crops currently recommended for the area by the local soil conservation districts.

A small dairy farmer in north-central Wisconsin on a 160-acre farm of gravelly and sandy loam also established a conservation system of farming by clearing land. His plan provided for clearing 18 acres in 3 years and converting 10 acres of steeply sloping cropland to pasture. In changing to a conservation plan the farmer reduced his annual acreage of grain by 3 acres but he maintained his production of grain through better land treatment. By enlarging his dairy herd to utilize the additional forage produced, his labor income was increased by more than $700. The cost of land clearing, including bulldozing, farm machinery, and family labor, was $48 per acre.

St. Clair and Madison County, Ill., farmers near East St. Louis, who practiced a high degree of conservation farming during a 10-year period averaged $6.98 per acre more than those with com-

parable soil resources but a low degree of conservation farming. Similarly, in McLean County, in central Illinois, conservation farming showed an advantage of $4.77 per acre, while on more rolling farms in northwestern Illinois the advantage was $6.41. Wise land use was an important part of the conservation system of farming. The high-conservation farms had a higher proportion of their tillable land in hay and pasture. These included deep-rooted plants, particularly alfalfa and sweetclover.

Greater use of stripcropping, contouring, terraces, grass waterways, and buffer strips also permitted a larger acreage of cultivated crops without serious soil erosion. Both crops, and livestock to utilize the crops, contributed, along with good management, to the higher incomes of the high-conservation farms.

On the slowly permeable soils of northeastern Illinois, high-conservation farms earned in 1954 approximately $5 per acre more than low-conservation farms with comparable soil resources.

In an attempt to answer the question of costs and returns of individual practices, data are being collected for a number of areas. In Illinois studies, terracing cost $3 to $5 per 100 lineal feet. In Northeastern Illinois, grass waterways averaging 40 feet wide, required an outlay of about 10 to 21 cents per linear foot. A 4-year study on 270 farms in Illinois showed that man-labor and power and machinery costs were $24.50 per crop acre when farm operations were conducted on the contour and $26.08 when not on the contour. On the returns side, a 7-year record of the effect on yields of crops grown on the contour in contour strips or on terraced fields was compared with the yields of customary up-and-down-hill cultivation. The results were as follows:

Crop	Yield increase from contouring		
	Per Cent	Bushels per acre	Value
Corn	12	6.9	$7.38
Soybeans	13	2.7	5.64
Oats	16	6.9	4.69
Wheat	17	3.4	5.37

In summary, conservation systems of farming in the central Midwestern States generally require an increased proportion of cropland in forage crops and a well-managed livestock program to utilize the additional forage efficiently. This kind of program means considerable increase in farm capital, and 3 or 4 years before conservation farming increases net farm income. Crop yields, however, increase in the first year.

The highest reward for a man's toil is not what he gets for it but what he becomes by it. —John Ruskin

Several alternatives are open to farmers for providing the additional capital required in developing a conservation plan. Farmers may be able to provide the capital from savings or from current income by reducing farm and family expenditures. Livestock enterprises may be expanded by saving breeding stock from farm herds. When it is profitable to proceed more rapidly, borrowing may be necessary. Some commercial credit agencies are well informed as to the costs of and the returns from conservation farming and are ready to make the necessary loans.

Farmers who cannot obtain suitable credit for soil and water conservation on reasonable terms from commercial or other sources may obtain the necessary credit through a new governmental program administered by the Farmers Home Administration. It makes loans available for soil and water conservation for use by farmers or groups of farmers to pay cash costs of materials, equipment, and services for such land-improvement measures as construction and repair of terraces, establishment and improvement of pastures, fencing, drainage, and ditching.

Oldest Cow?

Banquet Brookie 1474895 — a four-legged Methuselah if ever there was one — has gone on to the "happy grazing grounds." Born in 1929, this famous example of Holstein longevity was 26½ years old — quite possibly a bovine record at the time of her death. Bred by Reed Stevens of Oakley, Utah, "Old Brookie" had never been on test when she was purchased — at the ripe old age of 16 — by Paramount Dairy, Farmington, Utah. Disregarding this late start, she produced an amazing 120,244 lbs of milk and 3,984 lbs. of butterfat — nearly five times the estimated lifetime totals of the average U.S. cow — during her next nine lactations.

Holland's Marketing System Stops the Clock

The Dutch system of auctions is unique but it works well and includes effective, farmer financed "price supports" . . .

Condensed from Foreign Agriculture

IF YOU were to find yourself in Rotterdam — or any other good-sized town in the Netherlands — around 5 o'clock some morning you would witness a scene that has no counterpart anywhere else in the world. At that hour Holland's horticultural auctions are getting under way. The canals are filled with barges laden with fresh vegetables, fruit, and flowers. The streets are jammed with trucks, wagons, and pushcarts. And all of them are converging upon a large hangar-like building. But it's what goes on in that building that makes Holland's marketing system unique.

All Dutch horticultural growers sell their produce by auction —and by the clock. Not an ordinary clock either, but one that runs backwards, for the Dutch auction system reverses the usual procedure in that the asking price is always higher than the final bid.

Thus the first thing you would see upon entering a Dutch auction would be a tremendous clock on the wall above the auctioneer's head, the dial divided into 100 units. On the face are as many numbers as there are seats in the hall. Facing the clock are seats raised in tiers like the dress circle of a theater; each seat is numbered and equipped with an electric pushbutton connected with the clock, and also an outside telephone. These seats are rented by exporters, wholesalers, and retailers, all of whom must pledge either cash or a banker's guarantee to cover their anticipated purchases before they are allowed in the hall.

When the auction is ready to start the first auctioneer announces whether the bidding will be in guilders or cents, and if for the lot or per piece. Sample lots of the produce then pass along under the clock on a conveyor—or on the barges themselves if the hall is adjacent to a canal. Some halls have large display rooms where buyers inspect the produce and jot down the lot numbers they are inter-

Reprinted from Foreign Agriculture, Washington, D. C.

ested in, in which case samples are not usually brought into the hall, and the auction proceeds at a faster pace, frequently with as many as 10 sales per minute.

To start the bidding the pointer on the clock is set a few points above the average price for the type of produce being sold. Then it starts moving backwards. When it reaches the price which the bidder is prepared to pay, he presses his electric pushbutton, the clock stops, and the number of his seat lights up on the dial, thus showing his identity to the auctioneer.

This age of travel affects livestock as well as people. It's an unsophisticated steer these days, says the U.S. Department of Agriculture, that hasn't lived in 2 or 3 States before heading for the packing plant.

By this system two or more bids can never clash since all other buttons are automatically disconnected by the first contact. The buyer's name is then recorded, together with the quantity of produce he bought, and after he has paid the cashier he may take possession of his purchase. However, if the buyer is uncertain of the price he wants to pay, all he has to do is pick up the telephone at his seat in order to keep himself informed of fluctuations on other markets.

How the auction system started can be traced back to a somewhat insignificant occurrence in 1887 when the horticultural industry in the Netherlands was at its lowest ebb. One morning a grower arrived with his barge loaded with cauliflower and cabbage at the quay of the inland harbor of Brock-Op-Langendijk, a center of cabbage production in northern Holland. Normally the quay would have been filled with growers since it served as the general produce market, but on this morning the farmer with his bargeload of vegetables was the only one to show up. Immediately he was surrounded by buyers and commission agents, all trying to buy his produce. A passing bargeman suggested that he sell the bargeload by auction—which he did with most gratifying results.

Naturally this little cabbage and cauliflower auction did not transform Dutch marketing methods overnight, but from this tiny beginning developed Holland's national system of auction markets. By 1900 there were several auction associations throughout the country, and during World War I when Dutch produce was in great demand, the auctions developed rapidly. Today almost the entire country is served by a network of auction markets,

numbering some 175 and handling the entire national output of fruits, vegetables, flowers, and a portion of the bulbs, as well as those horticultural products that Holland imports.

These auctions vary in size and type. Some are classified by the produce they handle, i. e., vegetables, fruit, flower, or bulb auctions. Others specialize in the export trade, and as a rule are to be found in the highly concentrated horticultural areas. The so-called consumption markets are, as one would expect, in or near the large towns, while the import auctions are located at the overseas shipping ports.

Very few of the auctions are privately owned; most are owned by cooperative groups. Practically all, however, belong to the Central Bureau of Horticultural Auction Marts which sets up standards for the industry and holds a benevolent umbrella over the head of the Dutch grower.

To anyone not familiar with the Dutch auction system two questions naturally arise: first, how are the auctions organized and financed; and second, what are their advantages that a grower will voluntarily give up the independent control of his produce—as indeed he must under this system—and submit to group discipline.

How Organized

The Dutch auction associations, are organized much like any other cooperative in that they are controlled and financed by the members themselves. When a grower joins an auction he obligates himself to send all of his produce to that auction for a year, when he may change auctions if he wishes but again he must bind himself for another 12 months. His total acreage of vegetables, flowers, and glass is strictly limited although the acreage of his individual crops is not fixed. In return, the association inspects and grades his produce; rents him uniform, returnable containers at a nominal fee which he shares with the buyer—though this practice is gradually being supplanted by the use of cartons. The association supplies the auction facilities as well as the personnel to handle the produce and conduct the auction, and in the case of the larger auctions, provides storage rooms and packing sheds in the vicinity of the auction hall.

The financing of all this is relatively simple. A large part of the auction association's revenue comes from the rental of seats in the auction halls. The remainder comes from the growers themselves. To join an auction a grower pays a small membership fee. His main contribution, however, comes from the small percentage—2 to 3.5 per cent—which is deducted from each sale.

Growers are paid weekly, though generally the amount of each grower's sales minus this percentage for market service is transferred to his account in his cooperative bank. These banks, incidentally, were started in 1955 by the growers themselves, and have had considerable influence on the growth of the auction markets.

In a general sense, the main advantage of the auction system for the Dutch grower is that it brought order out of the chaotic situation that had existed previously when the grower not only had to cultivate his holding but to pack and dispose of his produce as best he might. Actually, there were malpractices on both sides. Some dealers took advantage of their position to the detriment of the grower's interests, while growers often delivered produce far below standard, particularly when demand was good.

Today the individual grower is no longer working in the dark but is assured of receiving the price his product is worth at the time of the sale. This is especially important when dealing with perishable goods where the grower cannot wait for prices to stabilize before selling. As for the buyer, the advantage of quality control, exercised by the auction associations in checking and grading the goods to be sold, more than compensates him for any quick profits he might make on a non-organized market.

Minimum Price Insurance

Yet most important for the grower is the minimum price policy adopted by the Central Bureau in 1948. Briefly, here is how it works: Every grower pays a certain amount as a premium, which is deducted from his earnings on e v e r y t h i n g he sells through auction. This commodity levy, which varies from 1 to 5 per cent depending upon the commodity and the season, goes into different commodity funds, which in turn are used to compensate growers for unsold produce. Each commodity fund is separate and individually financed in order to avoid one crop subsidizing another.

The mechanics of this policy is based on the minimum price for each commodity, which has been worked out by the Central Bureau and is always below the cost of production. If this were not so the system would not work; producers could grow simply to gain the compensation price. At an auction when the bidding reaches this minimum price the clock is stopped. The produce not sold is either processed or destroyed, and the grower of the unsold produce receives a compensation price, usually about 80 per cent of the minimum price, but, in the case

of highly speculative produce, sometimes as low as 50 per cent. The reasons for this difference between the minimum price and the compensation are partly to build up reserves, partly to gain funds to finance processing methods, and partly because the unsold produce is not generally of as high a quality as the goods sold at or above the minimum price.

The value of the minimum price scheme to Dutch horticulture has been immense, and has enabled the industry to put its own house in order without seeking government help. But it can serve only as a cushion against sudden temporary gluts or decreasing demand. It cannot control general economic tendencies or counteract fluctuations in international trade.

No survey of the Dutch auction system should fail to mention the very foundation of its success, namely, the cooperative spirit among the growers and their willingness to accept controls without which the system could not function.

Space Requirements and Arrangements For Loose Housing

High producing dairy cows will produce as well under loose housing conditions as they will in a warm stanchion barn and loose housing may cost an efficient dairy farmer less, save him chore time and permit flexibility as to herd size, according to Stan Witzel, University of Wisconsin.

There are four major areas to consider, says Witzel.

1. The bedded area. Provide an open shed with 40 square feet of floor area for small breeds of cows and heifers to 60 square feet for large breeds. It should have provisions for storing the season's supply of bedding.

2. Hay storage and feeding area. Provide hay storage space for from two to three tons of high quality hay, either baled or chopped. Feed from one or both sides of the ground level hay storage building.

3. Silage feeding may be in the open or under roof. Mechanical feeding can be arranged with either the tower type or horizontal silo.

4. Feeding areas and barn lots having concrete pavement are essential for keeping cows clean and to permit the use of tractor mounted scraper and loader in all seasons. About 100 square feet is required per cow.

Antibiotics for Laying Hens

Recent experiments show antibiotics can increase production from 5 to 8 per cent . . .

Condensed from American Poultry Journal

J. R. Couch,
Texas A. and M. College

ADDITION of an antibiotic to the laying feed will increase egg production, according to experiments at Texas A. & M. College. Approximately 16 grams of penicillin per ton was used in these studies. From 1950 to 1953, a number of experiments were conducted in our laboratories in which it was shown that levels of aureomycin, terramycin, bacitracin and penicillin ranging from 10 to 16 grams of the antibiotic per ton would increase egg production from 5 to 8%.

It might be of interest to the producer to determine just what such an increase in egg production would amount to. If it is assumed that a hen lays 150 eggs per year on a feed without antibiotics, then this hen would produce an extra dozen eggs if egg production were increased 8%. If the hens were laying 200 eggs on a feed without antibiotics and the egg production were increased 8%, this would amount to an increase of 16 eggs per hen. It is readily apparent from such calculations that the addition of antibiotics to the laying ration will pay off.

Improves Feed Efficiency 5 - 10%

Some have failed to observe an increase in egg production from the addition of antibiotics to the laying ration. It is a recognized fact that antibiotics do not have any effect on the growth of chicks when fed to birds under extremely clean conditions, as for example, an air-conditioned laboratory where the air is exchanged at regular intervals. Such conditions prevail only in a temperature controlled research laboratory.

It is also a recognized fact

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that the antibiotics will increase the growth of chicks kept under practical conditions. Such an increase ranges from 5 to 15%, and there is also an improvement in feed efficiency of 5 to 10%.

It is now an accepted fact that antibiotics exert a beneficial effect on growth and/or egg production by the elimination of unfavorable bacteria from the bird's system.

Sanitation Is Still Necessary

A poultry farm is contaminated if chickens have been on such a farm more than one year. It is impossible to maintain as clean an environment on a poultry farm such as exists in an air conditioned, temperature controlled research laboratory. This is the reason why antibiotics increase egg production.

The poultryman must continuously attempt to overcome the disease which prevails on the average poultry farm. Antibiotics do not in any way permit the poultryman to relax from a rigid program of disease control and sanitation. The use of antibiotics in laying feeds simply supplement good, careful practices.

There has been a great deal of emphasis during the past 2 years on the use of higher levels of antibiotics in laying feeds. The higher levels of antibiotics described in this article are from levels ranging from 50 to 400 grams per ton. The high level antibiotic feeding plan can be pursued with the continuous feeding of the high level, by intermittent feeding or by therapeutic treatment of the birds when feed consumption drops and the birds appear to be ill.

Very dramatic results have been obtained through the high level feeding techniques where a particularly high level of disease exists on a poultry farm. Data from one experiment conducted on the Poultry Farm at Texas A. & M. College might be discussed briefly. In this instance, White Leghorn pullets were placed in laying houses on litter, and a level of 65% egg production was maintained for 3 months.

At the end of this time, the birds appeared to be sick, feed consumption decreased, and a respiratory syndrome developed. Birds that were fed the nutritional level of antibiotics (10 grams per ton) laid at a rate of only 20% during the next 3 months. The feeding of 100 grams of aureomycin per ton during the same period maintained the egg production at a level of 45%.

It is obvious that these birds were sick, and that the feeding of the antibiotic at the 100 gram per ton level maintained a higher level of egg production than

did the accepted nutritional level (10 grams per ton).

Results from an experiment conducted in 1955 might also be of interest to the reader. Approximately 700 White Leghorn hens were on test in a caged layer house. Various types of treatments were being studied, including levels of antibiotics ranging from 10 to 100 grams per ton. During the first 5 months of the experimental period, the feeding of the antibiotics appeared to have little effect on egg production. The level of production during this period was approximately 65%.

Prevents Slump in Egg Production

A respiratory infection swept through the caged layer house at about the beginning of the 6th month. There was a drop in egg production from 65 to 50 to 55% where the birds were not receiving antibiotics. Such a slump in egg production was prevented by feeding higher levels of the antibiotics in this test. Thus, additional data is provided to the effect that a slump in egg production was prevented through the continuous feeding of antibiotics in the laying diet with caged layers.

In many of the studies conducted in our laboratory, a level of the antibiotic higher than the so-called nutrition level has been used and has been found to produce an increase in egg production. It appears to the writer that it might be wise for the poultryman and the feed manufacturer to use a level of 20 to 25 grams of an antibiotic or combination of antibiotics in laying feeds in order to obtain the most effective results with regard to increasing egg production.

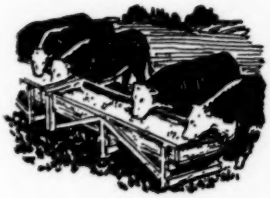
Studies have been conducted in this laboratory with streptomycin and penicillin. It was shown in 1955 that penicillin or a combination of penicillin and streptomycin would produce an increase in egg production during a 5-month experimental period. The level of penicillin used in this study was 50 grams per ton, and a combination of 25 grams of penicillin and 25 grams streptomycin per ton was also used.

Bacitracin was found to increase egg production in studies conducted in this laboratory in 1952 and 1953. The levels of bacitracin used ranged from 10 to 100 grams per ton.

Terramycin has been found to increase egg production when used at levels ranging from 10 to 100 grams per ton.

Aureomycin has been extensively studied at levels ranging from 10 to 200 grams per ton, and it has been found to increase egg production under the conditions which exist on the poultry farm of the Texas A. & M. College System.

Feeding Liquid Molasses



It boosts beef gains, removes smell from grass silage, takes dust from ground alfalfa. Now, it's easier to handle . . .

Condensed from The Farmer

LIQUID molasses — that stuff you used to pour over your 4-H club calf's grain ration to give him a slick show coat—is coming back.

It is being used by beefmen, sheep feeders and dairymen in increasing numbers as a binder to get exactly the right proportion of ground alfalfa and cracked corn into fattening steers, as an alfalfa silage preservative to eliminate disagreeable odor, with alfalfa to make a better fattening lamb feed, as an appetizer to get fattening heifers onto full feed in a hurry. Roswell Garst, Coon Rapids, Iowa, uses urea-molasses to replace corn protein in a low-cost, high-roughage steer feed.

Improved Handling Methods

More molasses is available now. Handling methods have been improved.

Before World War II most blackstrap (cane) molasses was used for making fermentation alcohol. Then, with increased war-time demand, synthetic alcohol came into the picture. Blackstrap wasn't needed in such large supply for alcohol. The feed trade became a main user, as it had earlier. At the same time sugar beet production increased in the Upper Midwest. That put beet molasses on the market.

With more liquid molasses available for agriculture, better ways were found to handle it. Bulk delivery was developed. Farm storage and mixing facilities were improved. Just recently, a plastic lined, cardboard box about the size of a block of salt and containing 75 pounds of liquid molasses was put on the market.

Must Contain 48% Sugar

Molasses is important for livestock because of its concentrated carbohydrate content. It must contain at least 48% total sugars to be sold and usually contains four or five per cent more. Six

Reprinted by permission from The Farmer, St. Paul, Minnesota

and one-half gallons of molasses is equivalent to one bushel of corn in feed value.

Farmers list several other advantages. It improves the palatability of poor quality forage and allows one to grind "stemy" hay without having to fight alfalfa dust.

"We want to keep our balance of corn to alfalfa the same for all steers, so they will gain evenly," says Mr. Ellefson of Jackson County, Minn. "So we grind our alfalfa, mix it with cracked corn and use molasses as a binder. That way one steer can't go heavy on corn and another heavy on alfalfa."

Mr. Ellefson feeds from 400 to a thousand steers a year. They buy "green" (grassfed) cattle off Western ranges, along with some heavier cattle out of local stockyards, put fast three to three-and-one-half pound daily gains on them and sell again in two to four months.

They started on molasses a year ago by putting in a 4,000 gallon molasses storage tank and a special molasses mixer which mixes ground alfalfa and molasses evenly. Ground alfalfa comes from a glass-lined silo and feeds automatically into the molasses mixer. A second glass-lined silo, alongside, contains shelled corn. Corn feeds automatically from that silo into a grinder and from there to an overhead bin. Corn and alfalfa-molasses is now mixed by hand, but will soon be mixed automatically overhead and dropped directly into a feeding wagon.

Their feeding mixture is two-thirds cracked, shelled corn to one-third ground alfalfa-molasses. Molasses makes up 20% of the alfalfa end of the ration. Along with that, each steer is fed one pound per day of 32% protein supplement and stilbestrol premix.

Gain 3 Pounds Per Day

That ration produces three pound per day gains. On their last batch of green Montana steers they averaged 3½ pounds per day for 60 days.

"We figure putting molasses in the ration increased daily gains by 50%," says young Gordon Ellefson. "Our feed is more palatable and we've got a constant feed mixture. We can get cattle on full feed quicker—ten days or less. Cattle seem more contented, they gain faster and finish quicker. They look better, their coats are better and that seems to pay off in the market."

On the Ellefsons' corn-alfalfa-molasses mixture, each steer eats about two pounds of molasses per day. The molasses, delivered at their farm, costs about two cents per pound.

Pat Caldwell, in Cottonwood County, Minn., feeds 2,500 to

3,000 heifers a year. He buys Western calves and light yearlings, feeds them to 850 pounds, then butchers them for his wholesale meat trade. "Our trade wants light carcasses of a good to choice grade," says Mr. Caldwell. "That's why we buy heifers and feed them molasses—to get fast gains."

He has found his best gains came from good alfalfa hay and cracked corn, mixed in definite proportions with molasses.

For finishing cattle he mixes 50 pounds of ground alfalfa to 50 pounds of cracked, shelled corn, then adds 10% liquid molasses. Like Ellefson, he has a molasses mixer. No supplement is fed, but the heifers do get mineral free-choice.

Mr. Caldwell gets 2½-pounds-per-day gains on that ration. One recent batch of 230 were put on feed weighing 600 pounds, came off averaging over 800 pounds just 80 days later at a feed cost of 16 cents per pound of gain. They went on full feed the day they hit the feedlot. "We haven't time to bring cattle up to full feed, and with molasses, we don't have to."

Heifer calves get a ration of 200 pounds of ground corn to 500 pounds of ground alfalfa. To that is added 10% molasses. Like heavier cattle, calves go onto full feed immediately. "We've lost only one animal out of 6,500 from over-feeding," says Mr. Caldwell.

Molasses costs him 2¼ cents per pound, delivered.

Compares With Corn

Louie Andrews, in South Dakota, figures his molasses costs against corn prices. There are 171 gallons of molasses in a ton and 6½ gallons equal a bushel of corn in feed value. "That means you get the same amount of feed in a ton of molasses as in 26 bushels of corn. If corn is worth say $1.50 per bushel (about 30-35 cents above the current free corn price) you could pay $39 per ton for molasses. Or, feed part corn and part molasses, depending on their relative costs."

Don Loskota, Renville County, Minn., went to molasses to get away from the disagreeable odor of alfalfa silage.

Molasses was delivered to Mr. Loskota's concrete stave silo for two cents a pound. It was fed in at the blower rate of 100 pounds per ton of green (slightly wilted) alfalfa silage. Water was run through the blower from a hose for ten seconds after each load. By so doing there was no trouble from molasses gumming the blower spout.

Cut Spoilage

"Molasses reduced my spoilage, added some feed value and, most

important, got rid of the odor," says Mr. Loskota.

Milk cows get 50 to 60 pounds of silage per day, plus all the alfalfa hay they want. High producers get oats in addition, according to production, but none get added supplement. "The alfalfa silage plus the molasses contains all the protein they need to stay in good flesh."

Total United States population is expected to increase from 161,461,000 in 1955 to 221,500,000 in 1975. . . providing 60,039,000 more people to eat farm crops. Farm population decreased from 25,058,000 in 1950 to 22,158,000 in 1955 — leaving 2,900,000 fewer farmers to supply the growing population.

Odor of Mr. Loskota's molasses-alfalfa silage is sweet, sharp and rather pleasant. "Not disagreeable as it used to be." Its color is a darker brown than silage made previously. Cows like it. There was no seepage from the silo this year, even though hay was wilted less.

Recent work with ammoniated molasses (a product which allows cattle and other ruminants to utilize non-protein nitrogen about as they do urea) has been done at Louisiana State University. There, ammoniated molasses was substituted for protein at the rate of 13% of the protein equivalent for milking cows, and up to 30% of the protein for heifers without decreasing milk production or growth.

At Iowa State College, experiments with fattening beef have shown a molasses-urea combination to give good gains from low cost roughages such as ground corn cobs. Urea supplies the nitrogen for the rumen microorganisms and molasses the readily available energy, sulfur, trace minerals and one or more as-yet unidentified factors. Purdue A cattle supplement uses molasses as a source of energy and minerals.

In addition to its sugar content, beet molasses is a good source of protein. Beet molasses contains 4% to 10% protein, 9% to 14% ash and some other minerals. Black-strap (cane) molasses contains 2% to 4% protein, plus the ash, other minerals and some vitamins.

Cost of molasses mixing and bulk storage equipment is rather expensive and a good-sized operation is needed to properly utilize it. However, some feeders have equipped themselves to do custom work as well as their own. And the new 75-pound cardboard box offers any feeder or dairyman an opportunity to try liquid molasses on any size scale he wishes.

Fertilizer Efficiency and Soil Structure

An interesting presentation of studies made at the University of California on preserving good soil structure . . .

Condensed from California Farmer

Daniel G. Aldrich, Jr.
University of California

A REDUCED rate of water penetration into soil usually means a breakdown of soil structure.

In all probability this breakdown can be attributed to faulty fertilizer applications, cultivation methods, or excessive traffic. Reduced water penetration means reduced fertilizer distribution and reduced aeration. Such conditions lead to a general decline of crop production.

Structure refers to the manner in which soil particles, sand, silt or clay are bound together as granules. Thus, the structure of a soil may change from time to time with variations in the nature of the material which binds the particles together. Texture on the other hand is a more or less permanent property of the soil in that it refers only to the proportionate amount of sand, silt or clay particles present in a soil and not to the manner in which these particles may be bound together.

Structural Types

From a practical point of view we recognize three structural types: grain, crumb and puddled.

An example of the first type is the sandy soil. Such a soil is loose and open with large individual pore spaces which allow a ready circulation of air and water. Its cultivation is extremely easy. However, such soils are often too loose and open and lack sufficient moisture and nutrient materials. They are as a consequence likely to be drouthy and infertile. There is only one practicable way of remedying this condition in the field and that is by the addition of organic matter.

The second type, and the one having the ideal structural con-

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dition for most farming operations, is most likely to occur in a loam soil. In such a soil some of the particles are large and function separately; others are medium to very fine in size, and may cluster together to form granules or aggregates. Thus, there are large pore spaces as in a sandy soil which facilitate drainage and air movement and numberless small pore spaces, as in a clay soil, in which water and nutrients may be retained.

The complex structure of the third type is usually developed in clay soils. In these soils the majority of particles are extremely fine. If the soil is correctly managed, aggregates of the proper size and nature are developed from the fine particles and result in a soil which is loose, open, friable and fertile. Improper handling, however, may break down the aggregates and an impervious, puddled soil is produced.

While a puddled condition is more frequently produced in a clay soil, the possibility of destroying aggregation and puddling a loam soil through improper handling is by no means remote.

Nutrient Elements

Calcium, and magnesium to a lesser degree, tend to promote and maintain good structure. Thus, good structure normally will be found in soils which contain considerable quantities of calcium. The calcium may be supplied by naturally occurring calcium sulphate (gypsum), or calcium carbonate (limestone), or calcium silicate in the soil, or may be added in fertilizers or soil amendments (nitrate of lime, gypsum) or by the irrigation water.

Sodium and ammonia on the other hand act in the direction of breaking down soil structure. Soils saturated with these nutrients slake or run together when wet, thereby limiting water movement and aeration. If crops are grown on a loam or clay soil which is low in naturally-occurring calcium and is irrigated with water of low calcium content, repeated heavy applications of a sodium-containing fertilizer may eventually produce a soil of sufficiently high sodium content to produce structural breakdown.

Actually it is only under very special conditions that ammonia builds up in the soil to a degree capable of destroying soil structure. Under soil conditions occurring in many parts of California, ammonia added to or produced in the soil is converted to nitrates which are taken up by plants or are leached from the soil. However, ammonia added to the soil as ammonium sulphate may build up to a point capable of impairing structure

if the pH of the soil is reduced to the point (less than pH 4.5) where soil organisms capable of converting ammonia to nitrates are destroyed. Such may be the case when repeated heavy applications of ammonium sulphate are applied to a soil which has no naturally-occurring limestone or other basic materials to neutralize the residual acidity of this fertilizer.

Organic Matter

Organic matter acts to create and preserve soil structure. Application of manure or other bulky organic materials to the soil and the growing of cover crops may be expected to reduce structural deterioration induced by high concentrations of sodium or ammonia in the soil. Where organic materials are used exclusively as the source of applied fertilizer, soil structure should be relatively good.

A typical example of the role played by fertilizers in maintaining or destroying soil structure can be found in the University of California Citrus Experiment Station fertilizer plots. Here, navel orange trees grown on a sandy loam soil free from naturally-occurring limestone and gypsum have been fertilized with various nitrogen carriers for a period of 20 years. Structure has remained good in plots receiving nitrogen either as calcium nitrate, or as manure. However, where nitrogen at the rate of 3 pounds per tree annually in one application has been supplied as sodium nitrate or ammonium sulfate, aggregation has been destroyed and structure is poor for reasons previously discussed.

This situation can be largely avoided if gypsum is added with the sodium nitrate and limestone with the ammonium sulphate. The gypsum provides a source of calcium to offset the structure-destroying property of sodium. The limestone neutralizes any acidity produced by the ammonium sulphate and permits the soil organisms which convert ammonia nitrogen to nitrate nitrogen to function. Thus, structural breakdown due to ammonia accumulation is avoided.

Farm Tax Rates

A recent report on Farm Taxes by the U.S. Department of Agriculture shows the highest rate per acre was $4.87 in New Jersey, while New Mexico had the lowest rate of 9 cents per acre. The average tax for the country as a whole was 81 cents. Only 15.6 per cent of West Virginia's farms had mortages, while the U.S. average was 27.5 per cent. Massachusetts had the highest rate, where 46.9 per cent of its farms had mortgages.

Why Your Cattle Like the Other Side of the Fence

Your cows can tell you when their feed is out of balance. Another interesting article by the country's leading authority on an interesting subject . . .

Condensed from
Western Livestock Journal

William A. Albrecht, University of Missouri

IN THE production of livestock—like any other kind of agricultural output — we must have a margin between cost and sale price. Unfortunately, some costs in livestock and agricultural production are not yet catalogued. Among those are the contributions from the soils as chemical items we already recognize, but more significant are the creative powers for new life which as yet we know little or nothing about.

Keeping the life stream of our farm animals flowing is not as simple as keeping the assembly line in an automobile industry operating at full capacity. We still do not create livestock. It creates itself as best it can, possibly in spite of us more than because of us. Since the life stream is carried by the proteins of the feeds, and not by the carbohydrates and the fats which make up the bulk of what we offer our animals, the major problem ahead is that of growing quality proteins in our forages. Here again there is the biological process and one we do not manage except by way of the soil from which the creation of all life takes its start.

Power of Creation

We are slowly connecting the soil with the nutrition of all our life forms, whether they be microbe, plant, animal, or man. We are all too slowly coming to see soil exploitation of the past and the present as the reason why our meat, milk, cheese, eggs, and other protein foods are becoming scarcer, more costly and less abundantly produced. We must look to the soil as power of creation if we are to evaluate what is ahead for any part of agriculture, especially livestock.

We now recognize that our

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farm animals as able connoisseurs of the quality of feeds. When we accept the self feeder, we admit that the pig will make a hog of himself quicker than we will. We can appreciate the unusual ability of our grazing cattle to assay the feed values of their forages more accurately than we can when we observe that they let the tall grass on the spot of their droppings grow taller, while they eat the short grass around it. Then, too, they are always trying to get the grass on the other side of the fence, provided the other side of the fence is out on the highway or on the railroad right-of-way. They prefer such places because there the soil fertility has not been exhausted by excessive cropping.

Eternal Struggle

If, in grazing, they can call the nutritional qualities so accurately in their "dumb" way of telling us, shall we not come to see that by giving attention to better treatments of our soil with limestone and other fertilizers, we can very probably build the soils for better herds? Shall we not see that when the protein-rich crops, like the legumes, are considered "hard to grow," that even plants, too, are struggling with the soil for their proteins by which their creative life stream flows to provide proteins for our animals?

Some simple observations prompt us to ask some questions and stimulate our thinking about the soil. Does it provide all that the cow needs?

Forages grazed by the cow have been called "grass" and "hay." They have been something to be cut with a mower or chopped, baled, stored in the barn, and measured as tons of dry matter. More machinery to reduce the labor requirements of the farmer has been guiding the production of grasses and hays, when in our humble opinion, that effort should be guided with the concern for more fertility in the soil for better nutrition of the cow by means of those feeds. The machinery has become primary in the agricultural picture. The cow has become secondary, if one can judge by the growing tractor population in contrast to the cow population.

Question Raised

When the plants we call "weeds" grow tall in the pasture while others are grazed closely, this is regularly considered a call for the mowing machine to fight the weeds. Instead when weeds "take" the pasture, that ought to be viewed as a case in which the cow is giving a new definition for the word "weeds." Careful observations of her behavior should raise the question in our minds whether she would sug-

gest hormone sprays for the fight on weeds on a national scale.

She is apparently telling us that weeds are not so much a particular plant species of bad repute within the vegetable kingdom. Rather, weeds are any plants making too little of nutritional value to tempt her to eat them for it. She lets them grow taller and tolerates the degree of her own starvation required to do so. She is telling us that she does not choose her forage by the technical plant name. Instead, she chooses it by the nutritional values in the plant according as the soil fertility helps to fabricate food values in it.

Enough Poem

Oh, Lord, please fill my mouth with worthwhile stuff,
And nudge me when I've said enough.

Recently a case came to our attention in which a herd of beef cattle was regularly going through knee-deep bluegrass and white clover on a virgin prairie—never fertilized and never plowed—to graze out the formerly well-fertilized, abandoned corn fields of cockle burrs, briars, nettles, and a host of plant species considered our worst weeds.

Opinions Differ

Here the cows were contradicting our plant classifications. They were disregarding what we offered as supposedly good grazing in the form of the bluegrass, and were going the greater distance to consume plants we have always called weeds and even noxious ones. Such was their choice, though only when the weeds were growing on more fertile soil. These cows would scarcely recommend the use of hormone sprays to kill certain plant species we classify as weeds. They would recommend more fertile soils instead. Then, apparently, no plant would be called "weeds" by them.

When the cow breaks through the fence is it her objective merely to get on the other side? A careful consideration of such cow behavior points out that she is not going from one of our fields to another one, both of which have had the fertility of the soil exhausted to a low level. Instead she is going from one of those areas of our neglected soil fertility to the railroad right-of-way, or to the public highway. She is going where the soils are still near the virgin fertile condition. Those soils have not been mined of their nutrient stores.

Supreme Judge

She is a judge of the feeding values, not the fattening values. She is producing offspring. She is calling for help in her struggles to keep her species multiplying.

She is telling us of the shortage of inorganic substances to make bones, or of the proteins in relation to the carbohydrates. She is also telling us of the deficient qualities of the proteins in some of their parts essential for her biological processes. She will be telling us more when we learn more of the physiological processes on which she depends.

That soil fertility makes a tremondous difference in the chemical composition of a single grass species, and one considered high in the scale of nutritious grazing, was shown recently by the research of the Soil Conservation Service of the USDA, in their analysis of little bluestem of the western Gulf Region. Samples of this choice feed of the once-prevalent American bison were collected in close proximity. They showed a range in protein from 1.5 to 16%, in phosphorus from .03 to .31%, in calcium from 0.7 to 1.58%, and in potassium from .10 to 2.17% of the dry matter. The higher values were as much as 10 times the lower ones in the cases of protein and phosphorus, 20 times for the calcium, and 21 times in the case of the potassium.

With such wide differences, even in the ash, would you believe the cow would have survived these many years if she had not been distinguishing between such extensive variations in plant composition?

Ash Elements

These were differences after the organic compositions influenced by, or containing, them had been destroyed by the ignition of the sample to leave only the ash. It says nothing about how widely the samples varied on the list of their organic compounds, like carbohydrates, proteins, and specific amino acids connected with the creative services these ash elements rendered.

It is significant that these widest variations occurred in calcium and potassium, which are only recently coming into consideration because of their deficiencies in the soil. Calcium has long been ammunition in the fight on soil acidity when during all that time it should have been at the head of the list of needed nutrient elements on most humid soils for the nourishment of plants, animals, and man.

The importance of the soil fertility in relation to the nutritional quality of the proteins has not yet had much attention. In this relation there seems to be much that spells deficiencies in nutrition going back more directly to the soil. In the humid soils of eastern United States we can grow corn in abundance. We are now considering a hundred bushels of this grain per acre as commonplace production. That has happened since we are

growing a hybrid grain, the poor reproducing capacity of which is not recognized because it is not used as seed for the succeeding crop.

More "Go," Less "Grow"

The size of the corn germ has been dwindling. Consequently the percentage of even "crude" protein in corn has been falling while at the same time the bushels per acre have been mounting. Protein production per stalk has become less and carbohydrate per stalk has become more. Capacity to help the animal make fat remains, but capacity for body growth and reproduction of the animal has fallen. We have more "go" food but less "grow" food.

Soil insecticides increased corn yields last year about 5 bushels an acre on 54 Illinois farms.

When the seed of this major grass, corn, is failing in its delivery of protein within itself, shall we not expect the corresponding failure in protein delivery in the other grasses grown in the same Cornbelt and harvested at near maturity as hay? Is it possible that we are moving toward a pasture system of livestock farming because only the young grass is concentrated enough or complete enough in the proteins and all the nutrient substances associated with them to nourish our animals, and keep them reproducing?

All these questions should bring us to connect proteins more closely with the soil under the animal rather than with only the animal itself. The cow cannot deliver proteins except as they are provided for her in the feed, save for the supplementary synthetic helps she can get from the microbial flora in her intestinal tract.

Amino Deficiency

The corn plant as a producer of the more complete array of the amino acids essential for the white rat and thereby presumably for the cow, suggests its capacity for delivery of such quality of nutrition is limited to the germ of the corn grain. Complete nutritional service does not include the endosperm of that grain. One needs only to feed the whole corn grain to Guinea pigs, rabbits, or rats to see how they eat out the germ first and no more, if the grain is plentifully supplied. The complete grain is deficient in the amino acids, tryptophane, methionine, and even lysine. It is for the provision of these few deficient amino acids, then, that so-called protein supplements have always been, and must still be, supplied from producing them.

Any other grass, like the corn plant and the grain it makes,

cannot create the complete proteins required to nourish animals unless the soils growing it provide all the fertility elements and compounds the plant needs in its creative operations.

Ability Demonstrated

The animal's ability to separate out the protein part in its feed, if given a chance, and the desperate struggle for that nutrient was clearly demonstrated by experimental trials with three pens of rabbits. They were each given 500 gram allotments of cracked corn grain which was changed to a new supply in the first pen after 25%; in the second pen after 50%; and in the third pen after 75% was consumed. By means of the rabbits' selection and consumption of more germ and less endosperm while feeding, the chemical analyses of the remnants showed that the consumed part was pushed up in protein concentration from 7.31% for the total sample to (a) 8.12 (b) 7.87 and (c) 7.53% for the consumption of (a) 25, (b) 50, and (c) 75% respectively.

More significant was the fact that the gains in weights of the animals in relation to the protein consumed tell us that the animal is selecting not for making more weight of itself. The gains as units of weight produced per unit weight of protein consumed in the corn were (a) 1.57, (b) 2.07, and (c) 2.36 respectively. These figures tell us that the rabbit does not choose to eat carbohydrates, to gain rapidly in weight, or to put on fat. His ambition for himself is quite contrary to our plans for him. Consequently if the animal instinct calls for more protein, and if this factor of the animals' nutritional wisdom has been working for better survival through better health and better reproduction when the animal roamed at large, shall we not use the animal's choice to guide us in the treatment of the soil for soil improvement? Shall we not use the animal's choice to guide our soil management for the growing of more proteins and especially those more complete in the essential amino acids by which we shall cooperate with the animals struggling to grow, rather than to fatten, themselves?

Quality Chosen

Merely more "crude" protein in the crops is also not the animal's choice, according to experiments with rabbits. A corn crop was fertilized with increasing amounts of nitrogen. The final grain crop was increased in its concentration of protein by four increments of more nitrogen fertilizers to give (a) 7.09, (b) 8.03, (c) 8.95, and (d) 10.44% of protein in the grain.

The rabbits were allowed to consume but 60% of the feed allotment before it was removed. When these four samples were all before them, they ate most of (a) and (b) but decidedly less of (c) and (d). They were telling us that the rabbit does not follow us and call for more of any crude protein as we measure protein and get more of it.

Our animals are choosing according to the quality of the proteins and not just quantity of nitrogen multiplied by 6.25 which is so commonly considered the protein we talk about. We need to learn of the quality of protein.

Fortunately for our beef supply, most of it resulted because the cow and her calving operation were on the western plains or open range. It was on the unweathered, more fertile soils. Now that we have exploited soil fertility and most of our animal industry is one of fattening, we are coming face to face with the need for the proteins grown to be more complete for animal reproduction. The costs in that process are reasons for artificial insemination. Failures in reproduction are blamed on microbial invasions, because they recognize a dying cow before we do. Nevertheless, with all the artificials in feeds, drugs, inoculations, or what have you, the high percentages of sterile cows, and the aborters, continually hamper the profit aspect. Trouble is ahead if one can judge the trend, and the hope lies in the soils as both the provocation and prevention of most of the difficulties.

Question Raised

Under artificial procedures, the numerous matings required for conception, which usually succeed eventually in case of natural insemination, cause us to give up and turn the shy-breeder over for slaughter. This should provoke some serious thinking. Such observations ought to raise the question whether the larger dose of semen repeatedly served by the male, in the former practice, is not a kind of successive hormone administration to bring about better ovulation and eventual conception. This may not be the case under the limited semen supply which is now used in the latter practice.

Under declining soil fertility and corresponding decline in feed values, the load of reproduction is becoming too heavy to be carried successfully during the period of gestation. If the increasing abortions and the mounting percentages of so-called "midget" calves are not studied more critically in terms of nutrition, rather than dodged by putting the blame on some aspect offering more mental escape,

these losses may occur astoundingly often.

Trouble Source

A few studies of the blood chemistry of the "midgets" have found such low levels, and near absences, of some of the soil-borne essential elements to suggest the source of the trouble in some nutritional deficiencies in the cow's feed, or troubles going back to the soil for their origin. Even then, the soil-borne essential elements must do more than hitch-hike from the soil through the crop, through the cow to the foetal calf. The creation of the "midget" calf suggests its irregularities traceable to irregularities in the fertility of the soil and the feed grown on it. It is leaning toward a waning faith in breeding but a waxing hope in feeding.

If our failing soil fertility is still supporting the plants as producers of carbohydrates, but is letting them down as producers of proteins, is it too much of a stretch of the imagination to see the cow being let down in calf production to the "midget" level during gestation by the low level of feeds pulled down by the deficiencies in the soil?

Only as we see feed proteins in their complete array of the quantities of amino acids balanced for body growth, for reproduction, and for protection against the invasion of foreign proteins like viruses and microbes; only as we learn more about how the cow would feed herself for offspring production rather than how we would carry her cheaply through the winter or fatten her; only as we discover the details of plant physiology by which we can know the crops which in combination will give us the complete proteins as feed; and finally, only as we know more about the soil fertility management that will undergird the plants' struggle in making proteins from the required chemical elements, can we expect to start the assembly line of the creation of livestock so that it will run in high order and without mishaps at all stages along that line.

Only as we build up the soil can we escape the fact that our proteins, which minister to better health for man and his animals, are becoming scarcer because the soil fertility for the soil's power of creation is going lower.

Rebuilding our soil is no small matter ahead as we view not only livestock production but good nutrition and good health also for ourselves.

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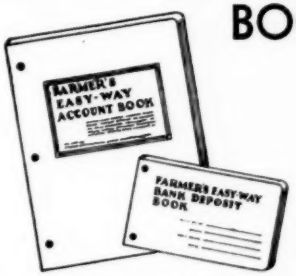

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FARM PRICES ARE COMING BACK —

In general, prospects and price predictions are encouraging for the coming months.

Already during 1956, farm prices have made a respectable come-back. A composite gain of 8% in 5 months has brought levels up to those of a year ago.

Quick payments on the Soil Bank Law also promise to aid farm income. Farmers who plow under immature crops of wheat, cotton, corn, rice, peanuts and tobacco may receive government payments yet this year, probably in late summer or early fall. Under the law, these payments will be made only to farmers who raise less than their federal planting allotments. Rates will average nationally about $40 an acre for corn, $24 for wheat, $70 for cotton and $34 for rice.

According to agricultural economists, hog prices are expected to reach a summer peak during late June or early July. However, a rather sharp price drop may then develop if farmers, remembering the substantial price decline which occurred last year, bunch marketings more than usual. The economists see a much smaller seasonal hog price decline this fall and winter than the $10 decline of last year.

Price of milk going into fluid use in much of the midwest will be higher than it otherwise would have been by 46c per 100 pounds in June and 26c per 100 pounds during July. This increase is due to the elimination of the usual summer decline in milk prices in most federal order markets. The adjustment is in addition to the 10c per hundredweight increase in federal price support levels for the marketing year.

Higher prices for fed cattle for the June to September period are indicated because of prospective reductions in numbers and weights of cattle to be marketed. Feeder cattle prices during the remainder of 1956 are expected to continue lower than during 1955.

The price of corn during June and July will be around the $1.40 level in corn surplus areas if the Commodity Credit Corporation continues to sell two to three million bushels per week. The effective ceiling on the farm price of corn is about $1.50. After mid-summer corn will be influenced by the prospects for the new crop as well as CCC actions.

(Price predictions from Purdue University agricultural economists.)